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# **BULGARIAN JOURNAL OF SCIENCE AND EDUCATION POLICY (BJSEP)**

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## **A STUDY ON THE VIEWS OF MOTHERS OF PRESCHOOL CHILDREN ABOUT CHILDREN'S BOOKS**

**Emine AHMETOĞLU, Remziye CEYLAN**

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**Abstract.** This study was conducted to examine the views of mothers of preschool children about children's books. It was conducted on 512 mothers with male and female children who were attending public and private preschools located in the center of Edirne and affiliated with the Ministry of Education. Data were collected with a "Questionnaire Form" developed by the researchers. It comprised two parts. The first one included questions about children and their family members, while the second one included questions about mothers' views on children's books. Data were entered into SPSS 11.0 and analyzed through percentages. The results showed that 96% of the mothers in the sample bought books for their children at least several times every month, and that 61% preferred to buy illustrated storybooks, 20% preferred tales, 3% preferred magazines, and 16% preferred to buy more than one type of book. It was also found that 89% of the mothers read books for their children at least several times every month, and that 69% made their children browse the illustrations and answer questions about the book, asked

them to summarize the contents or explained unknown words after reading.

*Keywords:* parents, children's books, preschool education, reading habit, illustrated books

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## **Introduction**

Children are affected by many stimuli starting from birth throughout their development. Books as a stimulus play an important role in all stages of children's lives. In the preschool period when children's linguistic, perceptual, motor, social and emotional development is fastest, books affect all of children's developmental areas positively. In addition, they prepare children for life, and contribute to their listening and reading skills (Hansen & Zambo, 2005).

Family members are partly responsible for introducing children to reading and instilling in them a love for books. In order for parents to choose the right books for children, they need to know their children's developmental level and the characteristics of books suggested for children at that level (Yörükoğlu, 1997). For instance, books written for preschool children aged 3-6 should be durable. In addition, books for preschool children should have many illustrations, drawings and not much print (Gönen, 1995). A previous study found that illustrated books affect 4-5 year old children's linguistic development positively (Gönen, 1988). As children are generally known to have more interest in imaginary tales and story-books about daily life (Öncül, 1989), books of this nature may be preferred to attract children's interest.

Children usually meet books for the first time with their parents' help. Parents with a reading habit read for them, buy books for them, take them to bookshops, and talk to them about the books they read. Likewise, it is equally important for parents to read in the presence of their children and thus set a positive model (Gönen & Devrimci, 1993). Other important factors in

encouraging children to read include parents' interest in books and the presence of a book collection at home. Likewise, having reading materials at home such as magazines also motivates children to read (Keleş, 2006). At the same time, appealing to children's emotions, informing them through listening, and making them evaluate the information gained by seeing are also important factors. The achievement of these relies on the awareness levels of parents and the views of mothers about using children's books. Therefore, this study aims to examine the views of mothers of preschool children about children's books.

### **Material and method**

As the study aims to examine the views of mothers of preschool children about children's books, it is a descriptive survey type study.

It includes the mothers of children attending public and private preschools located in the center of Edirne and affiliated with the Ministry of Education. A total of 512 volunteering mothers were studied.

A literature survey was conducted about the data collection tools and a two-part questionnaire form was developed by the researchers. The first part contained questions about preschoolers and their family members, while the second one included questions about mothers' views on children's books.

#### *Data analysis*

Data were entered into SPSS 11.0 and analyzed by using percentages.

### **Findings and discussion**

Of the mothers who participated in the study, 52.0% had daughters, 48.0% had sons, 52.0% had children aged 5, and 48.0% had children aged 6. As for the mothers, 24.6% were aged 30 and below, 43.2% were aged between 31-40, and 32.2% were aged 41 and above. In addition, 24.7% were

elementary school graduates, 37.6% were high school graduates and 37.7% were university graduates.

First impressions about valuing reading are formed in the family environment and children can develop a love for books and reading habits by following others who read in this environment (Dökmen, 2004). Therefore, the first point of investigation in the present study was whether parents read books or other materials, and whether this was observed by their children. It was found that the majority of children (86%) observed their parents while reading books or other materials. It was previously found (Gönen et al., 2004) that a difference existed between upper and lower socioeconomic levels regarding reading, and that upper socioeconomic families modeled reading more often for their children.

In the present study, we found that the parents of 88% of the preschool children read for them. This finding shows that parents were aware of the importance of books in child development. Similarly, Tezel Şahin et al. (2008) also concluded that 99% of mothers read books for their children. In a different study, it was ascertained that upper socioeconomic level families bought and read more books than lower socioeconomic families (Natsiopoulou et al., 2006).

In this study, the home environment of children was also examined, and parents were asked whether a book collection existed at home or in their children's bedrooms. Mothers' responses showed that 56% of children had a book collection at home or in their bedrooms. Accordingly, it can be said that these parents were aware of the importance of establishing a reading environment in instilling a love of reading in their children. A previous study also showed that 85.1% of children had a book collection at home (Gönen et al., 2004). In contrast, another study found that 73,2% of children did not have a book collection at home (Tuğrul, 2002). It is believed that the educational status and income level of the family may have caused this.



Being introduced to books at an early age is important if children are to love books and become good readers in the future. Therefore, the parents who participated in the study were asked to specify the time when they first bought and read books for their children. Nine percent said they did so when their children was 0-1 year old, 44% when their children were 2-3 years old, and 47% when they were 4-5 years old. Thus, all families had introduced their children to books in the preschool period. Coşkun Ögeyik & Ahmetoğlu (2008) found that the age when families introduced their children to books had a positive effect on the reading frequency of fifth and eighth graders.

**Table 1.** Distribution of mothers' views about their frequency of buying children's books

Frequency of book buying	N	%
Fewer than 3 times/week	354	69.0
Fewer than 3 times/month	140	27.0
Never; my child borrows from friends, siblings or relatives	18	4.0
Total	512	100.0

Table 1 shows that 69% of families bought books for their children fewer than three times per week, 27% fewer than three times per month, and 4% never did so because their children used books borrowed from friends, siblings or relatives. In general, families' book buying behaviors showed that the majority of the families in the study (96%) bought books at least several times a month. Children are first introduced to books by their parents. Being familiarized with books at an early age is an important factor in getting to love them. In a previous study investigating the frequency of parents' book buying, it was found that the majority of parents bought books for their children every one to three months (Tezel Şahin et al., 2008).

Another important activity that parents need to consider to make their children read more is to provide books at the right level for them. In this study, the parents were asked if they consulted anyone when choosing books

for their children. Their responses showed that the majority of families (88%) did not receive any consultation while 22% did. It was also found in this study that while choosing books for their children, 61% of the parents chose illustrated story books, 20% chose tales, 3% chose magazines, and 16% combined more than one genre. Tuğrul (2002) found in a different study that parents preferred illustrated books for their preschool children and educational books for their elementary school children. It is stated that preschool children are generally more interested in imaginary tales and story books based on daily life (Öncül, 1989). Therefore, choosing these types of books for them contributes to children's developmental areas. The physical features of children's books are also important in the preschool period. As these children are not literate yet, the visual elements of the books they read are important. It is therefore essential that books aimed at these children include many illustrations. The results of the present study showed that mothers took this into account when choosing books for their children.

**Table 2.** Distribution of mother's views about their frequency of reading for their children

Reading Frequency	N	%
Everyday	132	25.8
Several times/week	320	62.5
Less than twice/month	52	10.2
Never	8	1.5
Total	512	100.0

Table 2 shows that parents generally read several times a week for their children (62.5%), and those who read everyday constituted almost one fourth of the sample (26%). This revealed that one in every four families read for their children every day. In general, the majority of the parents who participated in this study (89%) read for their children at least several times a week.

In a study by Çakmak & Yılmaz (2009) was also found that the majority of parents (88%) read for their children at least several times a week. It can therefore be concluded that parents are aware of the importance of books in child development and they consequently read for their children. In the present study, 34% of parents stated that they made their children browse the illustrations in a book after reading for them and asked them questions, 22% stated that they made their children summarize the book, and 13% stated that they explained unknown words, while 31% stated that they did not engage in any special activities. It can be seen that the majority of families (69%) made their children go through the illustrations and answer questions about the book, asked them to summarize its contents, and explained unknown words. As reading for preschool children supports their development areas and encourages them to read, it is important that the contents of books are explained to children in a detailed way and at the right level for them. It is, however, believed that the family's sociocultural level is an important factor in doing so. A previous study revealed that middle socioeconomic level mothers gave more positive feedback and used more yes/no questions than their lower socioeconomic counterparts when reading for their preschool children (Rodriquez et al., 2009).

### **Conclusions and recommendations**

In this study which aimed to investigate the views of mothers of preschool children about children's books, it was found that 86% of the children observed their parents while reading books or other materials, 56% had a book collection at home or in their bedroom, and 88% were read to by their parents.

Nine percent of the parents who participated in this study first bought books and read for their children when they were 0-1, 44% when they were 2-3 years old, and 47% when they were 4-5 years old.

Of the participants, 69% bought fewer than 3 books weekly for their children, 27% bought fewer than 3 books monthly, and 4% never bought books as they borrowed from friends, siblings or relatives.

It was also found that 88% of parents did not receive any guidance when choosing books for their children and 22% did. In addition, 61% of the parents were found to buy illustrated story books, 20% tales, 3% magazines, and 16% more than one type of book.

Parents generally read for their children several times a week (62.5%), and approximately one fourth of the participants (26%) read regularly every day.

It was also shown that 34% of the parents who participated in the study made their children look at the illustrations in the book and asked them questions after reading. Twenty-two percent asked them to summarize the book, 13% explained unknown words and 31% did not engage in any special activity.

The following recommendations may be made in light of these findings:

Educational seminars about children's books may be organized for mothers who have a major role in child development and education. Mothers and families should be made more aware of the importance of children having their own book collections at home. Better cooperation may be established between publishers and writers in order to have higher quality and more economic books for preschool children. Families with preschool children should be encouraged to visit libraries, book exhibitions and fairs with their children. Library staff should be chosen from among people with knowledge of child development and books, and special library sections should be organized with books appropriate to the age, development level, and interests of preschool children (i.e., areas with low and open shelves, cushions, puppets and stuffed toys). Children attending preschools may be regularly taken to libraries, book exhibitions, fairs, and book signing events, and writers may be

invited to visit preschools. Parent-child reading programs may be organized at preschools and participation of families may be encouraged.

## REFERENCES

- Coşkun Ögeyik, M. & Ahmetoğlu, E. (2008). Reading habits of fifth and eighth grade primary school students in Turkey. *J. Reading, Writing & Literacy*, 3(2), 62-73.
- Çakmak, T. & Yılmaz, B. (2009). Okul öncesi dönem çocuklarının okuma alışkanlığına hazırlık durumları üzerine bir araştırma: Hacettepe Üniversitesi Beytepe anaokulu örneği. *Türk Kütüphaneciliği*, 23(3), 489-509.
- Dökmen, Ü. (1994). Okuma becerisi, ilgisi ve alışkanlığı üzerine psiko-sosyal bir araştırma. *Milli Eğitim Bakanlığı Yayınları*, Ankara.
- Gönen, M. (1988). *Anaokuluna giden 4-5 yaş çocuklarına resimli kitaplarla yapılan eğitimin dil gelişimine etkisinin incelenmesi*. Yayınlanmamış Doktora Tezi, Hacettepe Üniversitesi, Ankara.
- Gönen, M. & Devrimci, H. (1993). İlkokul 5. sınıf çocuklarında okuma alışkanlığının incelenmesi. 9. Ya-Pa Okulöncesi Eğitimi ve Yaygınlaştırılması Semineri. Ya-Pa Yayın Pazarlama San. Ltd. Şti, 40-49, Ankara.
- Gönen, M. (1995). Okul öncesi eğitiminde dil gelişimi açısından resimli çocuk kitaplarında muhteva. Birinci Çocuk Edebiyatı Sempozyumu, Ankara.
- Gönen, M. & Çelebi Öncü, E. & Işıtan, S. (2004). İlköğretim 5.,6. ve 7. sınıf öğrencilerinin okuma alışkanlıklarının incelenmesi. *Milli Eğitim Dergisi*, 164,7-36.
- Hansen, C.C. & Zambo, D. (2006). Piaget, meet Lily: understanding child development through picture book characters. *Early Childhood Education J.*, 33(1), 39-45.

- Keleş, Ö. (2006). *İlköğretim 4 ve 5. sınıf öğrencilerinde kitap okuma alışkanlığının incelenmesi*. Yayınlanmamış Yüksek Lisans Tezi, Gazi Üniversitesi, Ankara.
- Natsiopolou, T., Souliotis, D., Kyridis, A. & Hatzisavvides, S. (2006). Reading children's books to the preschool children in Greek families. *Intern. J. Early Childhood*, 38(2), 69-79.
- Öncül, N. (1989). *İllüstrasyon yöntemleri ve çocuk masal kitaplarında biçimsel çözümler (bir masal kitabı örneği)*. Yayınlanmamış Yüksek Lisans Tezi, Hacettepe Üniversitesi, Ankara.
- Rodriguez, B.L., Hines, R. & Montiel, M. (2009). Mexican American mothers of low and middle socioeconomic status: communication behaviors and interactive strategies during shared book reading. *Language, Speech & Hearing Services in Schools*, 40(3), 271-282.
- Tezel Şahin, F., Kandır, A. & Arslan, A. (2008). Anaokuluna devam eden çocukların anne ve babalarının çocuk kitaplarına ilişkin görüşlerinin karşılaştırmalı olarak incelenmesi. *Türk Halkları Edebiyatları II: Çocuk Edebiyatı Kongresi. Qafqaz Üniversitesi*, 515-519, Bakü.
- Tuğrul, B. (2002). 4-10 yaş grubunda çocukları olan ailelerin çocuk kitapları hakkındaki görüşlerinin ve tutumlarının incelenmesi. *Çukurova Üniversitesi Eğitim Fakültesi Dergisi*, 2(22), 21-30.
- Yörükoğlu, A. (1997). *Çocuk Ruh Sağlığı*. 21. Basım, Özgür Yayınları, İstanbul.

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## **CIVIL SERVANTS' PERCEPTION ON SERVICE DELIVERY OF PRIVATE AND PUBLIC ELEMENTARY SCHOOLS IN OGUN STATE, NIGERIA**

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**Abstract.** This study examines civil servants' perception on service delivery of private and public elementary schools in Ogun State, Nigeria. It employed descriptive design of survey type. Purposeful stratified and simple random sampling techniques were used to select 600 respondents among teachers, medical practitioners and local government employees from four out of the state's twenty local government councils. Four (two in one) hypotheses were generated and tested at 0.05 significant level. Self-developed questionnaire was used to generate data and student t-test (independent) statistical tool employed for the analysis. The findings revealed, among other things, that gender, age and social-economic status had no significant influence on the perception of civil servants on the service delivery of public and private elementary schools. Level of education, however, significantly influenced civil servants' perception on the service delivery of private elementary schools, whereas it did not affect their perception on service delivery of public elemen-

tary schools. Private schools were perceived to be better in the measured indices of service delivery. Government was advised to ensure adequate provision of resources in public schools and thorough supervision of public and private schools so that whichever a parent sends his children will be a matter of choice.

*Keywords:* civil servants, service delivery, elementary schools

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### **Introduction and overview**

Private and public elementary schools have existed side by side in Nigeria since the nineteenth century. The missionaries blazed the trail in 1840's by founding the first set of primary schools. Five decades later, 1899 to be precise, the colonial government established its first primary school in Lagos (Fafunwa, 1991).

In the 1950's, private individuals and religious organizations established nursery education—an adjunct of elementary education—in cities and urban centres. It was patronized by the elite and/or the working class. Working mothers liked nursery school as it served dual role: taking care of their babies and at the same time providing some form of formal education. Naturally, the parents would want their children to complete the nursery and primary cycles in the same institution (Oni, 2006).

Ever since, the public had showed interest in private elementary schools. Government too is not averse to the private initiative at providing formal education. In its policy document on education, it is clearly stated that it shall encourage private individuals, voluntary agencies and communities in the founding and administration of pre-primary and primary schools alongside those provided by the state and local governments.<sup>1)</sup>



Public and private schools are not exactly same. They are different in terms of their funding and administration. Whereas the former receive most of their funds from (and are administered by) the government, the latter rely on private sources, tuition fees and other levies charged and their control is largely private.

Some problems are common with public schools. Bumstead (1982) found that majority attributed public schools' disappointing performance to bureaucratic control, safety and discipline problems, insufficient money for teachers and programmes, inadequately prepared teachers, and special interest groups with conflicting goals. Jones-Wilson et al. (1992) and Crawford & Freeman (1996), identified the following as reasons responsible for parents' disinterest in public schools: lack of discipline, extremely large classes, the learners receiving less individual attention, and higher dropout rate, among others. Johnson (1999) found that majority of the parents believed that public schools did not provide a safe, orderly environment and teaching of the basics. Conversely, polling data have revealed that the general public is of the opinion that private schools have higher academic standards, have secure and conducive environment and more likely to encourage honesty and responsibility. (Anderson & Resnick, 1997)

Some of the reasons above and other factors account for the parents' choice of elementary school. In Nigeria, the likely reasons for the existence of more private schools than public schools, according to Ojemagbon (2009)<sup>2)</sup> included: quality of instruction, availability of facilities, and commitment of teachers. In addition, consideration was usually given to cost of education. Parents in other parts of the world too give serious thought to these reasons and even more.

In a study by Guymn<sup>3)</sup> on the evaluation of the Indianapolis Public Schools' Montessori Option (K-6) pupil progress report, he found that curriculum design and development, learning environment, programme expan-

sion, public school use of Montessori philosophy, and staff certification and training were factors influencing the choice of public schools. The results of a study conducted by Lankford & Wyckoff (1992), suggested that parents were sensitive to the relative quality of school offerings, the tuition of religious schools, and the student and family economic characteristics accompanying each alternative.

Sconyers<sup>4)</sup> in a survey on the opinion of parents about public schools, discovered that parents wanted children to learn academic content, but they were equally concerned with work habits, preparation for the workplace, maintaining discipline, and citizenship skills. They also strongly supported extracurricular activities, with a majority favouring community service requirements for graduation. Although they believed that public schools were superior in supporting diversity and providing special education, they rated private schools higher for promoting religious and social values; maintaining discipline, safety, and higher academic standards; and having smaller class sizes.

A study of the attitude of parents in Cleveland, Ohio, and Milwaukee, Wisconsin,<sup>5)</sup> indicated that test results are not what interest parents most when they are facing school choice. Parents are interested in what is being taught and who is teaching it, and they seldom mention results of achievement tests. Interviews with 270 parents, teachers, and school administrators in these two cities showed that information about the school's programme, primarily the curriculum and method of instruction, is the most common piece of information parents want in making a decision about where to send their children.

In a study entitled: 'An Evaluation of Parents' Patronage of Private Primary Schools in Abeokuta, Nigeria,' Onuka & Arowojolu (2008) found that five factors are responsible for the parents' support of private schools. These are: early opportunity to train a child properly, discipline, physical fa-

cilities/environment, dedication to work and the prediction of the child's future education.

To the question: "Are private schools superior to public schools?" Anderson & Resnick (1997) analyzed the arguments of their respondents, and concluded that the answer is "no". All things being equal, a good school is a good school, whether it is public or private. Private and public schools have highly similar graduation requirements, although private schools as a whole have smaller class sizes than do public schools and the teachers at private schools believe that they have more influence over curriculum offerings than do public school teachers.

### **Problem statement**

The explicit support by the government could perhaps have led to the present proliferation of private nursery and primary schools. On the other hand, the explosion of and rising school enrolment in fee-paying private elementary institutions in the face of economic recession and widespread unemployment could have been as a result of parents' great disappointment at the public primary schools which are tuition-free. As at year 2000, there were 1308 public primary schools. The number has grown up to 1390 in 2009. As regards private primary schools, the number in the state as at year 2000 was 409. In just nine years, i.e. 2000 - 2009, the number had grown to 1362.<sup>1)</sup>

The different studies cited above have contributed to our understanding of the motivating factors when it comes to the choice of elementary school by the parents. The main objective of the present study, however, is to determine the perception of civil servants on the service delivery of both private and public schools. This set of people is set aside for investigation on this matter because they are among the active players and also a major stakeholder in the educational system. Thus, they should be able to make an informed decision on issues of interest, especially one relating to education.

A study of this nature may likely be an eye-opener to other government policies especially at this time when government at different states of the federation is contemplating handing over schools to their previous owners. Findings of a study of this nature may further assist government and other stakeholders in education to take decision on an important educational matter.

The posers of this study, therefore, are: what is the perception of the civil servants on service delivery of private and public elementary schools; to what extent do sex, age, educational background and socio-economic status influence the civil servants' perception of private and public elementary schools.

In order to provide solution to the problem under investigation, the following hypotheses were formulated and tested at 0.05 level of significance: (1) there is no significant difference in the perception of male and female civil servants on service delivery of public and private elementary schools; (2) there is no significant difference in the perception of young and old civil servants on service delivery of public and private elementary schools; (3) there is no significant difference in the perception of the educated and uneducated civil servants on service delivery of public and private elementary schools; (4) there is no significant difference in the perception of civil servants of low socio-economic status and those of high socio-economic status on service delivery of public and private elementary schools.

### **Methodology**

The study was a descriptive one. It was carried out in Ogun State. Ogun State, made up of the following four distinguishing zones—Egba, Ijebu, Remo and Yewa—has 20 local government areas (LGAs). After having stratified the 20 LGAs into zones, one LGA from each of the zones was sampled using simple random sampling procedure. Altogether, 4 LGAs—

Abeokuta South, Ijebu-Ode, Sagamu and Yewa South—representing 20%, were sampled.

The target population comprised three categories of civil servants. These were: teachers (primary and secondary school teachers), medical practitioners (doctors, nurses and pharmacists), and local government employees. There were 26 686 teachers in the primary and secondary schools, 249 medical practitioners (doctors, nurses and pharmacists), and 8015 local government employees in the state.<sup>2)</sup>

Civil servants who were parents were purposely sampled. They could be: young, i.e. those whose eldest children's age ranges between 4 and 8 years; old, i.e. those whose eldest children's age ranges between 9 years and above; educated, i.e. those who possess at least Nigeria Certificate in Education; uneducated, i.e. those whose highest academic qualification is below Nigeria Certificate in Education; of low socio-economic status, i.e. those having large nuclear family members and low income of less than fifty thousand Naira (#50,000.00) monthly; and of high socio-economic status, i.e. those having fairly small nuclear family members, high income of more than fifty thousand Naira (#50,000.00) monthly, personal car(s) and house(s). In each sampled LGA, 50 teachers, 50 medical practitioners and 50 local government employees were sampled. Altogether, 200 teachers, 200 medical practitioners and 200 local government employees participated in the study.

A questionnaire entitled: 'Civil Servants' Perception on Service Delivery of Private and Public Elementary Schools Questionnaire' was designed and used in the collection of data. The questionnaire was in two parts: Section A, of 23 items, solicited general information on respondent's sex, age, educational background and socio-economic status. Section B had 15 items—indices of service delivery expected of private and public primary schools. Each respondent was expected to indicate which of the two schools was better than the other on the basis of service delivery and at what rate.

The instrument was administered on a pilot study group which comprised 20 teachers, 20 medical personnel and 20 local government employees at Owode in Obafemi-Owode Local Government Area. Crombach Alpha was used to determine the reliability coefficient of the instrument. The reliability coefficient was found to be 0.8197. The high reliability coefficient indicated that the instrument was reliable.

## Results

### *Hypothesis 1:*

**Table 1.** Comparisons in the perception of male and female civil servants on service delivery of public and private schools

School	Sex	N	$\bar{X}$	SD	df	T	Sig.
Private	Male	226	17.46	7.38	555	-0.553	0.581
	Female	331	17.84	8.31			
Public	Male	226	12.31	7.72	555	0.347	0.729
	Female	331	12.07	8.47			

The Table 1 shows that there is no significant difference in the perception of male and female civil servants on service delivery of private elementary schools ( $t = -0.553$ ;  $p > 0.05$ ). Also there is no significant difference in the perception of male and female civil servants on service delivery of public elementary schools ( $t = 0.347$ ;  $p > 0.05$ ). This implies that gender does not influence the perception of the civil servants on the service delivery of public and private elementary schools.

*Hypothesis 2:*

**Table 2.** Comparisons in the perception of young and old civil servants on service delivery of public and private schools

School	Age	N	$\bar{X}$	SD	df	T	Sig
Private	Young	169	18.16	6.77	555	0.910	0.363
	Old	388	17.48	8.63			
Public	Young	169	11.47	7.22	555	-1.339	0.181
	Old	388	12.47	8.54			

The Table 2 shows that there is no significant difference in the perception of young and old civil servants on service delivery of private elementary schools ( $t = 0.910$ ;  $p > 0.05$ ). Likewise there is no significant difference in the perception of young and old civil servants on service delivery of public elementary schools ( $t = -1.339$ ;  $p > 0.181$ ). This implies that age does not influence the perception of the civil servants on the service delivery of public and private elementary schools.

*Hypothesis 3:*

**Table 3.** Comparisons in the perception of educated and uneducated civil servants on service delivery of public and private schools

School	Education	N	$\bar{X}$	SD	df	T	Sig
Private	Uneducated	94	20.46	8.65	555	3.674	0.00
	Educated	463	17.12	7.89			
Public	Uneducated	94	11.51	10.19	555	-0.857	0.392
	Educated	463	12.30	7.69			

The Table 3 shows that there is a significant difference in the perception of uneducated and educated civil servants on service delivery of private elementary schools ( $t = 3.674$ ;  $p < 0.05$ ). On the other hand, there is no significant difference in the perception of uneducated and educated civil servants on service delivery of public elementary schools ( $t = -0.857$ ;  $p > 0.05$ ). This

implies that while education influences the perception of the civil servants on the service delivery of private elementary schools, it does not affect their perception on the service delivery of public elementary schools.

*Hypothesis 4:*

**Table 4.** Comparison in the perception of low socio-economic status and high socio-economic status civil servants on service delivery of public and private schools

School	Socio-Economic Status	N	$\bar{X}$	SD	df	T	Sig
Private	Low Socio-Economic Status	419	17.40	8.00	555	-1.433	0.152
	High Socio-Economic Status	138	18.54	8.41			
Public	Low Socio-Economic Status	419	12.55	8.29	555	1.907	0.057
	High Socio-Economic Status	138	11.02	7.68			

The Table 4 shows that there is no significant difference in the perception of low socio-economic status and high socio-economic status civil servants on service delivery of private elementary schools ( $t = -1.433$ ;  $p > 0.05$ ). Also there is no significant difference in the perception of low socio-economic status and high socio-economic status civil servants on service delivery of public elementary schools ( $t = 1.907$ ;  $p > 0.05$ ). This implies that socio-economic status does not influence the perception of civil servants on service delivery of private and public elementary schools.



## **Discussion**

The results of the study indicates that gender, age and social-economic status have no influence, whatsoever, on the perception of the civil servants on the service delivery of public and private elementary schools. However, the results reveal that level of education influences their perception on the service delivery of private elementary schools, but it does not affect their perception on service delivery of public elementary schools. Private elementary schools are adjudged to be better in the measured indices of service delivery. It is perceived that private schools have better facilities and qualified teachers when compared with their public school counterparts.

These findings are not surprising. In actual fact, they are in line with the researcher's expectation. As a civil servant working in a public school on the one hand and as a parent who has children in private schools up to the university level on the other hand, personal experience about today's elementary schools has revealed that age, gender and socio-economic status are not strong determinants of parents' choice of patronage of school either public or private. As a matter of fact, old and young and male and female civil servants patronize both public and private schools.

The truth is that the downtrodden in the society stand shoulder to shoulder as much as possible with their affluent counterparts when it comes to school-related issues in particular and educational matters in general. This is so because the poor and oppressed see education as the only leverage or bridge that needs to be crossed in order to be on a par with the rich. This is why they pay through the nose for their children's education. To put it in a nutshell, parents, irrespective of age, gender and socio-economic status attach nearly the same value to educational matters.

It is also not unexpected that level of education significantly influenced parents' perception on the service delivery of private elementary

schools. In other words, both the educated and the unlettered civil servants differ in the way they adjudged the service delivery of private elementary schools. The experience and exposure of educated parents, having being in the four walls of the school environment, and having enjoyed good education themselves, will definitely come to bear in rating very salient issues such as curriculum content, method of instruction and other less obvious but equally important matter which, altogether, is the culmination of service delivery and of which private elementary schools have an edge over public elementary schools.

At the same time, however, level of education does not affect parents' perception on the service delivery of public elementary schools. Both educated and uneducated have the same opinion on the service delivery of public elementary schools which was adjudged to be poor. Incessant workers' strike, inadequate facilities, and unconducive environment, among others, are common with public primary schools. According to Johnson (1999) and Ojemagbon,<sup>2)</sup> this simple fact explains the continuous dwindling enrolment of pupils in the public schools and the proliferation of private schools especially at the primary and post-primary levels of education. In a study on evaluation of parent patronage of private schools, Onuka & Arowojolu (2008) affirmed that quality of instruction, availability of facilities, conducive learning environment, high quality supervision and commitment of teachers put private schools ahead of public schools in service delivery.

In all, the findings corroborated previous research works<sup>2,4,5)</sup> (cf. also in Johnson, 1999) on parents' choice of primary elementary schools which clearly indicated that parents are interested in what is being taught, those teaching it and the methods used in teaching it.

## **Recommendation**

Arising from the findings above, it is crystal clear that government will need to step up the re-engineering process of the educational sector, especially at the pre-primary and primary levels.

It is recommended that government should ensure adequate provision of educational resources—financial, human and materials—in all the public schools. In addition, the Ministry of Education’s Department of Primary, Teacher and Non-Formal Education, in charge of formulation, review and execution of policies which concern the administration of pre-primary education and primary education, among other things, and the Department of Inspectorate Services, saddled with the responsibility of ensuring quality control and enhancement of standards in all schools, as well as other agencies including National Institute of Educational Planning and Administration, Universal Basic Education Commission, and State Universal Basic Education Board, should be up and doing and monitor what goes on in public and private elementary schools.

This becomes necessary so as to guarantee equal and high academic standards in all the primary schools throughout the state and, indeed, the whole nation and, by extension, instill in the public a lasting interest and patronage of the sector. If the public elementary schools are made attractive, sending children to private elementary schools will, therefore, just be a matter of choice.

## **NOTES**

1. Federal Republic of Nigeria. *National Policy of Education*, 4<sup>th</sup> Edition, 2004; cf. also: Ogun State Universal Basic Education Board, Abeokuta. Ogun State Ministry of Education, Abeokuta.

2. <http://www.nigeriavillagesquare.com/articles/sylvester-ojenagbon/in-search-of-a-cheap-school-for-my-children/pdf.html>; also A Report of Human Resources Statistics of the Ogun State Public Service, 2009 Edition.

3. Guynn, S.J. (1989). *Evaluation of the Indianapolis public schools' Montessori option (K-6) pupil progress report*. Indianapolis Public Schools.
4. Sconyers, N. (1996). *What parents want: a report of parents' opinion about public schools*. John Hopkins University Centre of Families, Communities, Schools and Children's Learning.
5. <http://www.eric.ed.gov/PDFS/ED414376.pdf>

## REFERENCES

- Anderson, K.M. & Resnick, M.A. (1997). *Careful comparisons: public and private schools in America*. Alexandria: National School Board Association.
- Bumstead, R.A. (1982). Public or private: what parents want from their schools. *Principal*, 61(4), 39-43.
- Crawford, J. & Freeman, S. (1996). Why parents choose private schooling: implications for public school programs and information campaigns. *ERS Spectrum*, 14(3), 9-16.
- Fafunwa, A.B. (1991). *History of education in Nigeria*. Ibadan: NPS Educational Publishers.
- Johnson, C.D. (1999). *The exit skills summer academies: staff and parents' perception*. Detroit: Office of Research, Evaluation and Assessment.
- Jones-Wilson, F.C., Arnez, N.L. & Asbury, C.A. (1992). Why not public schools? *J. Negro Education*, 61, 125-137.
- Lankford, H. & Wyckoff, J. (1992). Primary and secondary school choice among public and religious alternatives. *Economics of Education Review*, 11, 317-337.
- Oni, J. (2006). *The administration of the Nigerian primary and secondary education systems*. Abeokuta: Gbemi Sodipo Press.

Onuka, A.O.U. & Arowojolu, A.F. (2008). An evaluation of parents' patronage of private primary schools in Abeokuta, Nigeria. *Intern. J. African & African American Studies*, 7(2), 58-70.

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# **CONSTRUCTIVIST INSTRUCTIONAL STRATEGY AND PUPILS' ACHIEVEMENT AND ATTITUDE TOWARDS PRIMARY SCIENCE**

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**Abstract.** The study investigated a constructivist instructional strategy and pupils' achievement in and attitude towards primary science. The population was 650 Basic-5 pupils in 21 public primary schools in Western Senatorial District of Rivers State, Nigeria. The sample of 180 pupils was drawn from four intact classes from four schools in the area. Primary Science Achievement Test (PAST) and Primary Science Attitude Scale (PSAS) were the instruments used for the study. Test-retest reliability coefficient and Cronbach alpha 21 reliability was 0.82 for PSAT and 0.85 for PSAS, respectively. Four research questions and four corresponding null hypotheses guided the study. Analysis of covariance (ANCOVA) and multiple classification analysis (MCA) were used in analyzing the data. Results showed that the constructivist strategy was more effective than expository strategy in facilitating pupils' achievement in and attitude towards primary science. Pupils' from urban

schools performed significantly better than pupils from rural schools under each of the two methods. The researchers advocated for the use of constructivist strategy by primary science teachers among their recommendations.

*Keywords:* constructivism, achievement, attitude, primary science

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## **Introduction**

Science and technology have become a yard stick for measuring the rate of economic development and advancement of the countries. Scientific advancements are reflected in various aspects of their national cultures and practices, including political stability.

In trying to emulate the developed countries of the world, the developing nations, including Nigeria, have made vigorous attempts aimed at scientific and technological advancement. For instance, the objective of science education in Nigeria, as for back as the 1947 education policy, has been to introduce the child to the understanding of nature.<sup>1)</sup> In the era of regional government in Nigeria, science in terms of nature studies, agriculture and hygiene were emphasized. In the National Policy of Education, one of the cardinal goals of science education includes the development of scientific literacy among the citizens.

Presently, primary science is one of the two subjects in the primary school system which is taught by specialist teachers. The other is the English language. Indeed, the Nigerian government places so much emphasis on the inculcation of scientific literacy in the primary school pupils that the teaching of primary science features prominently in the annual workshops organized for primary school teachers in Nigeria. Such care and attention by government justify the assertion by (Ahiakwo, 2005) that the solution to scientific and technological take-off of Nigeria must start from the primary school since it is the foundation of our educational system on the whole. The Nigerian government, be it military or civilian, attaches much importance to science

and technology in the modernization process. This is evidence in government policy, for instance a special ministry of science and technology is erected. Moreover the federal government has yielded the ratio of 60:40 in favour of science for admission into all forms of tertiary institution in Nigeria.

The National Policy on Education FRN, 2004, emphasizes the importance of primary science by making one of the objectives of primary education to be the laying of a sound foundation for scientific and reflective thinking. The policy also speaks volumes on the appropriate use of instructional strategies in the teaching and learning of primary science, which is meant to be practical, explanatory and experimental. Despite these efforts by government, students' achievement in primary science is not always commendable. Most often, the blame is leveled on the primary science teachers who are said to use wrong approaches in teaching Primary Science particularly the expository method. Achievement and better attitude towards science can only be achieved through a paradigm shift from the traditional method to such an approach that would enhance the development of science process, skills and scientific attitude. Such approach is the constructivism strategy.<sup>2)</sup> The strategy, according to Agulana & Nwachukwu (2004), focuses on meaning-making and knowledge construction and not mere memorization. In this approach the learner learns by personally and uniquely developing an understanding and making sense of information. The constructivist strategy is considered a veritable tool for shifting science teaching from the traditional chalk and talk method, which is teacher-centered, to the hand-on method, which is learner-centered. The constructivist strategy focuses on problem - solving, constructing and reconstructing ideas and methods.

The constructivist strategy fits into the model called 'experiential designs' (Etuk & Afangide, 2008). The instructional strategies subsumed under this model involve the learners as active participants in the learning process. Attention is shifted from the subject-matter content to the method used in im-



parting the knowledge. The emphasis in the use of the constructivist instructional strategy is on the development of learning skills, information search and retrieval and on learning how-to-learn (Etuk & Afangide, 2008). Cognitive skills are expectedly acquired in the course of interactions. The learning skills so acquired would remain life-long while the specific intellectual skills are likely to be forgotten with time (Bigge, 1971).

Advantage of the constructivist instructional strategies include enhancement of a child's natural curiosity, development of creative and manual skills, utilization of the child's environment for teaching and learning and holistic development of the child. These provide basic tools for educational advancement of the child for useful living in the society, within the limits of an individual's capacity. Brooks & Brooks (1993) identified the effectiveness of constructivist strategy in teaching science concepts in the United States of America. Holloway (1999) also researched on the constructivist strategy and noted its effectiveness in academic achievement in chemistry in Washington schools. In Nigeria, the works of Nworgu,<sup>2)</sup> Ochilangua (2001) and Awodeyi (2005) all emphasized the effectiveness of constructivist strategy in enhancing school achievement and development of positive attitude towards the study of science in secondary schools.

Most works done on the use of constructivist strategy was at the secondary school level. Hence, this study investigated the constructivist strategy and pupils' achievement in primary science and attitude towards science in Western Senatorial District of Rivers State of Nigeria.

### **Statement of problem**

The Nigerian primary science programme lays much emphasis on the development of science process skills in the primary school pupils; the development of literacy and the scientific skills. Despite the emphasis by the educational policy as evidenced in the curriculum, most Primary Science teachers

still teach in the non-scientific fashion. They teach science without the necessary facilities, often times with chalk and talk. Poor teaching method by primary school teachers would likely generate untold negative multiplier effects, including poor performance and negative attitudes towards science in the later school lives. When such happens Nigeria would be deprived of possible successful science and technology experts and such an ugly situation would not engender the much needed technological development of Nigeria. Therefore the major concern of this study was to investigate the effect of constructivist instructional strategy on pupils' achievement in and attitude to primary science. To this end four null hypotheses were formulated to guide the study.

### **Research hypotheses**

(1) There is no significant difference between pupils' achievement in primary science when taught using a constructivist against an expository instructional strategy; (2) There is no significant difference between pupils' attitudes towards primary science when taught using a constructivist as against an expository instructional strategy; (3) There is no significant difference between urban and rural pupils achievement in primary science when taught using a constructivist as against an expository instructional strategy; (4) There is no significant difference between urban and rural pupils' attitude towards primary science when taught using a constructivist as against an expository instructional strategy.

### **Research method**

This study used the 2x2 pre-test control group designs. The population was 650 primary 5 pupils in 21 public primary schools in western Senatorial District in Rivers State of Nigeria. The sample was 180 pupils drawn using the criterion sampling technique. The instruments used for the study were Primary Science Achievement Test (PSAT) and Primary Science Attitude Scale

(PSAS). The PSAT had 20 items designed to test the pupils' attitude towards primary science and measured in a 4 point scale. A test re-test reliability coefficient of 0.82 was established for PSAT and Cronbach alpha reliability coefficient of 0.83 for the PSAS.

Pupils in the experimental group were taught using constructivist strategy while the control group was taught using expository strategy. Lesson packages were based on simple machines. Four intact classes of pupils' drawn from four selected schools were used. Two classes (the control group) were taught using expository strategy while the other two classes (the experimental group) were taught using constructivist strategy where by the pupils were given problems to solve, ideas to construct and to reconstruct. The two groups were administered a pre-test before and post-test after the treatment. A pre and post attitude questionnaire was also administered. Data were analyzed using analysis of covariance (ANCOVA) and multiple classification analysis (MCA).

## Results

**Table 1.** One way analysis of covariance (ANCOVA) of post-test scores of pupils' achievement taught using a constructivist and an expository instructional strategy using pre-test scores as covariates

Source of variation	Sum of square	df	Mean square	F	Sig.
Covariate pretest	149.555	1	149.55	1.656	.200
Main effect instructional Strategy	2768.169	1	2762.169	30.587	.000
Model	2911.724	2	1455.862	16.121	.000
Residual	5984.187	177	90.306		
Total	8895.911	179	105.584		

significant at .05 level; critical  $F_{2, 177} = 3.06$ ;  $N = 180$

The entries in Table 1 indicate that instructional strategy main effect was significant at  $p < .05$  alpha level. The calculated F-value of 16.121 is

greater than the critical F-value of 3.06 at .05 with 2 and 177 degrees of freedom. Thus, the null hypothesis which stated that there is no significant difference between pupils' achievement in primary science when taught using a constructivist as against an expository instructional strategy is rejected. This implies that there is a significant difference between the academic achievement of pupils taught using constructivist and those taught using expository instructional strategy.

Consequently upon the observed difference in the main effect, multiple classification analysis (MCA) was considered to determine the index of relationship and also determine the variance of the independent variable (achievement) in primary science that is attributable to the influence of the independent variable (instructional strategies) as shown in Table 2.

**Table 2.** Multiple classification analysis (MCA) of the post-test scores of pupils taught using constructivist as against an expository instructional strategy

Grand mean = 74.02	N	Unadjusted		Adjusted for independent and covariates
Variable + category		Dev'n	Eta	Dev'n Beta
Teaching strategies			0.38	0.38
Constructivist	93	3.78		3.79
Expository	87	-4.05		-4.05
Multiple R. = 0.393				
Multiple R. Squared = 0.154				

Table 2 indicates that instructional strategies (constructivist and expository) have an index relationship of 0.14 (Beta value of 0.38<sup>2</sup>) with the academic achievement of pupils in primary science. Table 2 also indicates that the deviation of adjusted post-test score of pupils taught with the constructivist strategy from the grand mean of 74.02 is 3.79 while the deviation of the adjusted post-test scores of pupils taught using the expository strategy difference from the grand mean of 74.02 is -4.05. This implies that the pupils taught

using expository instructional strategy achieved significantly higher than pupils' taught with expository instructional strategy. The multiple regression index  $R$  of 0.393 and multiple regression squared index ( $R^2$ ) of 0.154 implies that 15.4% of the variance in the enhancement of pupils achievement in primary science was attributed to the influence of instructional strategies.

**Table 3.** One way analysis of covariance (ANCOVA) of attitude scores of pupils taught using a constructivist as against an expository instructional strategy with pre- test scores as covariate

Sources of variation	Sum of squares	df	Mean square	f-cal.	F-crit.	Decision p<.05
Pretest	382.16	1	382.16	30.31	3.89	*
Main effect	1948.32	1	1948	154.51	3.89	*
Explained	2352.74	2	1176.37	93.29	3.04	*
Residual	2231.63	177	12.61			
Total	4514.85	179	38.63			

\* significant at p<.05 alpha level

As shown in Table 3, instructional strategies main effect was significant at p<.05 alpha level. The calculated F-ratio of 154.51 is greater than the critical F-ratio of 3.89. Thus the null hypothesis which stated that there is no significant difference between pupils' attitude to primary science when taught using a constructivist as against an expository instructional strategy was rejected and the alternate hypothesis upheld. This implies that there is a significant difference between the attitudes of pupils taught using a constructivist instructional strategy as against the expository instructional strategy. Consequent upon the observed difference in the main effect, multiple classification analysis (MCA) was considered to determine the index of relationship and also determine the variance of the dependent variable (attitude) to primary science that is attributable to the influence of the independent variable (teaching strategies) as shown in Table 4.

**Table 4.** Multiple classification analysis (MCA) of the attitude scores of pupils taught using a constructivist as against an expository instructional strategy

Grand mean	N	Unadjusted	Adjusted for independent and covariates		
Variable + category		Dev'n	Eta	Dev'n	Beta
Teaching strategy			0.64		0.66
Constructivist	92	3.92		3.97	
Expository	88	-3.75		-3.77	
Multiple R. = 0.725					
Multiple R. squared = 0.526					

As shown in Table 4, the instructional strategies (constructivist and expository) have an index relationship of 0.64 (Beta value of 0.66<sup>2</sup>) with the attitude of pupils to primary science. Table 4 also indicates that the deviation from the grand mean of 70.15 of the adjusted pos-test scores of pupils taught using the constructivist instructional strategy is 3.97 while the deviation of the adjusted post-test scores of pupils taught using expository instructional strategy is -3.77. This implies that pupils taught using the constructivist strategy have more positive attitude to primary science than pupils taught using the expository instructional strategy. The multiple regression index R of 0.725 and multiple regression squared index (R<sup>2</sup>) of 0.526, imply that 52.6% of the variance in the attitude of pupils to primary science was attributable to the influence of instructional strategies (constructivist and expository instructional strategies).

**Table 5.** 2 x 2 factorial analysis of covariance (ANCOVA) of post-test scores of urban and rural pupils using pre-test as covariates and taught using a constructivist and an expository instructional strategies

Source of variation	Sum of squares	df	Mean square	F	Sig.
Covariate pre-test	149.555	1	149.555	1.934	.266
Main effect	4895.916	2	2447.958	31.657	.000
Teaching strategy	2762.169	1	2762.169	35.720	.000
School location	2133.747	1	2133.747	27.593	.000
2-way interactions teaching strategy school location	318.038	1	318.038	4.113	.044
Model	5363.509	4	1340.877	17.340	.000
Residual	3532.403	175	77.328		
Total	18895.911	179	105.564		

significant at .05 level; critical F<sub>4, 175 - 2, 43</sub>, N = 180

Table 5 shows that the calculated F-value of 17.340 is greater than the critical F-value of 2.43 at .05 alpha levels. Thus, the null hypothesis which stated that there is no significant difference between urban and rural pupils achievement in primary science when taught using a constructivist as against an expository instructional strategies is rejected. This implies that school location had an influence on the academic achievement of pupils in primary science when taught using a constructivist instructional strategy as against an expository instructional strategy. Since the difference in the main effect was significant, multiple classification analysis (MCA) was considered to determine the index of relationship and also determine the variance of the dependent variable (achievement) in primary science that is attributable to the influence of the independent variable (school location) as shown in Table 6.

**Table 6.** Multiple classification analysis (MCA) of the post-test scores of pupils from urban and rural schools taught using a constructivist strategy as against an expository instructional strategy

Grand mean = 74.02	N	Unadjusted		Adjusted for independent and covariates	
Variables + category		Dev'n	Eta	Dev'n	Beta
School location			0.38		0.34
Urban	101	3.40		3.08	
Rural	79	-4.35		-3.93	
Multiple R. = 0.517					
Multiple R. Squared = 0.267					

Table 6, reveals that school location (urban and rural) has an index of relationship of 0.12 (beta value of  $0.34^2$ ) with the academic achievement of pupils in primary science. Table 6 also shows that the deviation of the adjusted post-test scores of urban school pupils' from the grand mean of 74.02 is 3.08 while the deviation of the adjusted post-tests scores of pupils' from rural schools from the grand mean of 74.02 is -3.93. This implies that pupils from urban schools achieved significantly higher than pupils from rural schools with a multiple regression index R of 0.517 and multiple regression squared index  $R^2$  of 0.267. It implies that 26.7% of the variance in the enhancement of pupils' achievement in primary science was attributable to the influence of school location, when taught with a constructivist and an expository instructional strategy.

**Table 7.** 2 x 2 factorial analysis of covariance (ANCOVA) of attitude scores of pupils from urban and rural schools taught using a constructivist strategy as against an expository instructional strategy

Sources of variation	Sum of squares	df	Mean squares	F-cal	F-crit	Decision at $p < .05$
Pretest	382.16	1	382.16	24.25	3.89	*
Main effect	1949.43	2	974.72	61.85	3.04	*
SCH-LCT	1886.49	1	1886.49	119.70	3.89	*
TEA-STR	2135.08	1	2135.08	135.47	3.89	*
2-way interaction						
SCH-LCT * TEA-STR	20.74	1	20.74	1.32	3.89	NS
STR	2863.82	4	715.96	45.43	2.41	*



Explained	2957.61	175	15.76
Residual	5621.43	179	31.40
Total			

\*= significant at  $p < .05$  alpha level; NS = not significant at  $p < .05$  alpha level SCH-LCT = school location; TEA-STR = teaching strategy

Table 7 shows that the calculated F-ratio of 61.85 is greater than the critical F-ratio of 3.89. Therefore, the null hypothesis stating a non-significant difference between the attitudes of pupils towards primary science when taught using a constructivist strategy as against an expository instructional strategy is rejected. This implies that school location has influence on the attitude of pupils to primary science when taught using a constructivist and expository instructional strategies. Consequently upon the significant difference the school location main effect, multiple classification analysis (MCA) was considered to determine the index of relationship and also determine the variance of the independent variable (attitude) towards primary science that is attributable to the influence of the independent variable (school location) as shown in Table 8.

**Table 8.** Multiple classification analysis (MCA) of the attitude scores of pupils from urban and rural schools taught using a constructivist strategy as against an expository instructional strategy

Grand mean = 70.15	N	Unadjusted		Adjusted for independent and co- variates	
Variables + category		Dev'n	Eta	Dev'n	Beta
School location			0.66		0.57
Urban	95	2.96		2.72	
Rural	85	-4.38		-3.61	
Multiple R. = 0.632					
Multiple R. Squared = 0.399					

As shown in Table 8, school location (urban and rural) has an index of relationship of 0.66 (beta value of  $0.57^2$ ) with attitude towards primary sci-

ence scores of pupils. Table 8 also shows that the deviation of the adjusted attitude scores of pupils from the urban and from the grand mean of 70.15 was 2.72 while the deviation of the adjusted attitude scores of pupils from rural schools from the grand mean of 70.15 was -3.61. This implies that pupils from urban schools have more positive attitude towards primary science than pupils from rural schools. With a multiple regression index (R) of 0.632 and multiple regression squared index ( $R^2$ ) of 0.399, it implies that 39.9% of the variance in the attitude of pupils towards primary science is attributable to the influence of school location.

### **Discussion**

A significant difference was established in the science achievement of pupils taught using the constructivist and the expository strategy. The pupils taught using the constructivist achieved significantly better than those taught using expository instructional strategy. This agrees with earlier findings by Marshall (1992) and Ormrod (2004) to the effect that the constructivist strategy makes for greater achievement by pupils. A possible explanation for this is that the constructivist strategy involves the pupils more in the instructional process, both individually and in groups. The pupils would remember better what they participated in, in doing because they involved more sense organ than just the ear. They made use of their hands and eyes in the least.

A significant difference existed between the attitudes of pupils towards primary science when taught using the two strategies. The pupils taught using the constructivist instructional strategy developed a more positive attitude towards primary science than pupils taught using the expository strategy. This findings agrees with the findings of Kizito (2005) and Okoli (2006) who all attested to the superiority of the constructivist instructional strategy over the expository strategy, both in enhancing pupils achievement and in the development of more positive attitude towards the study of science. A possible ex-

planation to this is that when learners participate effectively in the teaching/learning process and so achieve higher, they tend to have a sense of satisfaction, growth and advancement and so develop stronger positive attitude towards the learning tasks. Pupils from urban schools achieved significantly more than pupils from rural schools. However, this finding contradicts to the statements of Okebukola (1993, 2002) and Oraifo (1997) as if no significant difference between the achievement of pupils in urban and rural schools.

A possible explanation for the better performance of pupils in urban schools is found in the facilities which are better because state government use primary schools in urban areas to show-case their performances. Moreover, schools in urban areas are staffed with more qualified teachers mostly wives of government officials who are made to stay permanently in the cities close to where their husbands work in order not to separate families. The assertion and findings by Okebukola (1993, 2002) and Oraifo (1997) that no significant difference existed between a primary science performance of pupils in rural and urban areas raises some doubts, knowing the degree of deprivation of pupils in rural areas, in terms of failure to master the language of instruction; in terms of lack of home support for academics and in terms of lack of well qualified teachers. If pupils in rural areas measure up in school achievement to pupils in the urban areas, the teachers of the earlier group might be more dedicated to their work.

Pupils from the urban schools had more positive attitudes than pupils from the rural schools. This finding is at variance with findings by Okebukola (1993, 2002) and Oraifo (1997) that no significant difference existed in pupils' attitudes towards science be it rural or urban. A possible explanation for this variation is that in the present civilian government in Nigeria, the government has done a great deal in lifting the image of primary schools. Roofs of buildings have been replaced and new structures have been set up and boreholes sunk in primary schools. These are done because of the Universal Basic

Education (UBE) scheme. Hitherto, primary schools were left for the local government to manage. The structures were dilapidated and teachers most often did not receive their monthly salaries on time. The story is different in the UBE era when the federal government has stepped into the scene with parity funding of primary schools. Schools in the urban communities seem to be more favoured in the amenities because they are located in the seats of governments.

### **Conclusion**

The study investigated pupils' achievement in and attitude towards primary science using two instructional strategies, the expository and the constructivist strategies. The constructivist strategy is not a single strategy but a collection of instructional strategies which make for experiential learning by pupils. The strategy used in this study was the problem-solving strategy. The superiority of other constructivist strategies like the project method, the open classroom and the inquiry method over the expository instructional strategy needs to be investigated.

### **Recommendations**

Based on the findings, it was recommended that: (1) The constructivist instructional strategy should be emphasized in teacher education curriculum at all levels to enable teachers have good background of the strategy; (2) Textbook authors should expose the readers more to the use of the constructivist strategy by writing about it in their books; (3) Teachers should as much as possible use the constructivist strategy in teaching topics in Primary Science; (4) Employees of teachers should organize seminars, workshops and conferences at periodic intervals for primary science teachers on the use of the constructivist strategy in teaching primary science; (5) Government should make teaching in the rural area more attractive by providing special incentives for

teachers in rural schools; (6) Primary school head teachers' should work hand in hand with the Science Teachers Association of Nigeria (STAN) to establish science clubs in order to nourish pupils' interests and attitudes towards science.

### *Limitation*

The pupils in the study were not taught by the same teacher. Although all the teachers who participated in the project were trained by the researchers, variations due to individual differences in the teachers are not ruled out.

### NOTES

1. Koshemani, J.M. (2000). How many lost generations can we afford. *A paper presented at the 6<sup>th</sup> convocation ceremony of the Federal College of Education (Tech), Omoku Rivers State.*

2. Nworgu, B.G. Constructivism a new trend in primary science teaching. *A paper presented at the Annual Workshop for Primary School Teachers, 10-12 May 1998.*

### REFERENCES

- Agulana G.G. & Nwachokwu, J.E. (2004). *Psychology of learning: putting theory into practice*. Owerri: Career Publishers.
- Ahiakwo, M.J. (2005). Primary school teachers' preparations for primary science (pp. 115-125). In.: Wokocha, A.M. (Ed). *Trends and issues in the Nigerian primary school system*. Uyo: Ivy Press.
- Awodeyi, A.F. (2005). The constructivist approach to teaching relationship between volume and capacity in school mathematics. *J. Science Teacher Association of Nigeria (STAN)*, 40(1&2), 21-27.

- Bigge, M.L. (1971). *Learning theories for teachers*. New York: Harper & Row.
- Brooks, J.G. & Brooks, M.G. (1993). *In search of understanding: the case for constructivist classrooms*. Alexandria: Association for Supervision and Curriculum Development.
- Etuk, G.K. & Afangide, M.E. (2008). *Curriculum organization and change*. Uyo: School Press.
- Holloway, J.H. (1999). *Constructivist classrooms*. Washington: University of Washington.
- Kizito, T.K. (2005). Constructivist teaching and students' achievement and retention in teaching the concept of waves. *Ghana J. Scientific Literacy*, 2(1), 98-102.
- Marshall, H.H. (1992). *Redefining students learning: root of educational change*. New York: Ablex
- Ochilongua, D.K. (2001). Effect of constructivist based instructional strategy on students' achievement in physics. *Intern. J. Pure & Applied Sci.* 7(5), 122-137.
- Okebukola, P. (1993). Schools variables and effects on students' achievement in biology. *Intern. J. Science and Society*, 8(2), 39-48.
- Okebukola, P. (2002). *Beyond the stereotypes to new trajectories in science teaching*. Abuja: Science Teachers Association of Nigeria.
- Okoli, J.N. (2006). Effects of investigative laboratory approach and expository method on the acquisition of science process skills by biology students of different levels of scientific literacy. *J. Science Teachers Association of Nigeria (STAN)*, 41(1&2), 79-88.
- Oriafo, K.T. (1997). Quality of school learning environment and students' achievement in chemistry. *Bulgerian Journal of Contemporary Issues*, 2(1&2), 57-68.
- Ormrod, J. E. (2004). *Human learning*. Upper Saddle River: Prentice Hall.

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# **THE EFFECTS OF INQUIRY-BASED SCIENCE TEACHING ON ELEMENTARY SCHOOL STUDENTS' SCIENCE PROCESS SKILLS AND SCIENCE ATTITUDES**

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**Abstract.** The purpose of this study was to determine Turkish elementary school students' level of success on science process skills and science attitudes and if there were statistically significant differences in their success degree and science attitudes depending to their grade level and teaching method. The total 241 students comprised of 122 males, 119 females. For this purpose, a pretest-post test control group and experimental group design was used. The data were collected through using Basic Science Process Skill Test and Integrated Science Process Skill Test and Science Attitude Scale. Study was conducted during the two semesters. Results of the study showed that use of inquiry based teaching methods significantly enhances students' science process skills and attitudes.

*Keywords:* science education, inquiry teaching, science process skills, attitudes

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## **Introduction**

Science process skills (SPS) are defined as transferable skills that are applicable to many sciences and that reflect the behaviors of scientists.<sup>1)</sup> They are the skills that facilitate learning in physical sciences, ensure active student participation, have students develop the sense of undertaking responsibility in their own learning, increase the permanence of learning, and also have students acquire research ways and methods, that is, they ensure thinking and behaving like a scientist. For this reason, it is an important method in teaching science lessons. SPS are the building-blocks of critical thinking and inquiry in science (Ostlund, 1992).

Learning science lessons by apprehending requires using science process skills (SPS). Having science process skills acquired, at the same time, means preparing future scientists, having scientific literacy acquired, that is enabling students to use science information in daily life (personal, social and global) (Harlen, 1999). Science process skills are based on scientific inquiry and teaching science by inquiry involves teaching students science process skills, critical thinking, scientific reasoning skills used by scientists (Pratt & Hackett, 1998) and inquiry is defined as an approach to teaching, the acts scientists use in doing science and it can be a highly effective teaching method that helps students for to understanding of concepts and use of process skills (Yager & Akçay, 2010).

Due to the above-mentioned importance of science process skills, many researchers have focused on this subject matter. In recent years, many studies have been conducted on students' acquisition of basic science process skills (BSPS) and integrated science process skills (ISPS).

Science- A Process Approach (SAPA) grouped science process skills under two main headings.<sup>1)</sup> The first is called as basic science process skills (BSPS), such as observing, measuring and using number, and classifying. BSPS provide the intellectual groundwork in scientific inquiry (Walters &

Soyibo, 2001). These skills are those which must be acquired in the first level of primary education. And the latter is called integrated science process skills (ISPS), such as controlling variables, formulating hypotheses, and experimenting. These skills are structured on basic skills. Some studies have indicated that there is a positive relationship between SPS and Piagetian development level and finding supports the separation of process skills into a two-level-hierarchy, namely basic and integrated (Brotherton & Preece, 1995).

### **The role of science process skills in science learning**

The studies aiming at developing school programs to improve science process skills began in 1960s. A perennial issue in science education concerns the emphasis to be given to methods of science the science process skills- in the school curriculum. AAAS started the studies on the issue in the USA in 1967 while DES did it in England in 1960s (Brotherton & Preece, 1995). Many studies have noted that science process skills are effective on teaching and learning about science (Brotherton & Preece, 1995; Harlen, 1999; Chang & Mao, 1999; Keys & Bryan, 2001; Walters & Soyibo, 2001; Turpin & Cage, 2004; Wilke & Straits, 2005).

Children are like scientists. For in the nature of many children is already the curiosity for searching and this curiosity leads them to search. In this way, children begin to search at early ages. That is to say, the skills and processes students use and develop are the same as those that scientists use while studying. These studies are necessary for understanding the functioning of nature and preparing livable environments. Scientists make observations, classifications, measurements, and inferences, propose hypotheses, and make experiments as well. Ways of thinking in science are called the process skills (Rezba et al, 1995). When we doing science we ask questions and find answers to questions, these are actually the same skills that we all use in our daily lives as we try to solve everyday questions. When we teach students to use these skills in science,

we are also teaching them skills that they will use in the future in every area of their lives. The use of science process skills by students increases the permanence of learning. For learning by doing, student uses almost all of his or her senses and learning becomes more permanent and hands-on activities get them to acquire experience. The development of science process skills enables students to solve problems, think critically, make decisions, find answers, and satisfy their concerns. Not only do research skills get students to learn some information about science, but also learning these skills helps them think logically, ask reasonable questions and seek answers, and solve the problems they encounter in their daily life. Problem solving is the essence of scientific investigations. Students are given a problem or they identify a problem, then they follow the guidelines of problem based learning to solve in the problem. As they follow the investigative process, they use the science process skills which are the methods and procedures of scientific investigation.<sup>2)</sup>

Teaching methods such as inquiry teaching, problem solving, problem based learning and project based learning relies heavily on the effective use of the science process skills by students to complete an investigation (Colley, 2006). Inquiry science teaching is teaching science by having students engage in more science activities and exercises and encourages children to learn science and learn about science (Olson & Louks-Horsley, 2000). Also, students engaged in simple inquiry engage in processes such as observing, comparing, contrasting and hypothesizing (Cuevas et al., 2005). One area of contemporary research on inquiry is related to children's understanding and use of science process skills in designing investigations (Keys & Bryan, 2001). Scientific inquiry exercises typically serve as the primary source of science process skill development and inquiry is used to teach science process skills (Wilke & Straits, 2005). According to Minner et al. (2010), the term inquiry has figured prominently in science education, three distinct categories of activities: what

scientists do, how students learn, and a pedagogical approach that teachers employ.

In a study done in Texas to compare the traditional program and inquiry oriented science program Mabie & Baker (1996) report that in favor of those following inquiry oriented science programs there was found a 75% difference in terms of the students' attitudes towards science. Furthermore inquiry-based instruction produced positive outcomes on student concept learning, (Chiappetta & Russell, 1982; Ertepinar & Geban, 1996; Gabel et al., 1977; Geban et al., 1992); and problem-solving, laboratory instruction, cooperative learning, and discovery instruction methods are commonly referred to as the inquiry science teaching, which often emphasizes extensive use of science-process skills and independent thought (Basaga et al., 1994; Mao et al., 1998; Chang & Taipei, 2002; Brickman et al., 2009). It could be concluded here that having science process skills is a prerequisite to learn about science.

From a science perspective, inquiry-based science teaching engages students in the investigative nature of science. Inquiry involves activity and skills, but the focus is on the active search for knowledge or understanding to satisfy a curiosity. According to Ketpichainarong et al. (2009) inquiry teaching and learning methods affect student performances, for example in solving problems, reflecting on their work, drawing conclusions, and generating prediction. These qualities are necessary for a high-achieving graduate.

### **Science process skills in Turkish education system**

Starting from 2000s, the significance of the acquisition of science process skills has been appreciated in Turkey when developing science syllabuses. Up until now, two major changes have been made in elementary education science programs concerning the 6-14 age groups. The first one of them was made in 2000 and has been applied since 2001-2002 academic year. Different from the preceding program, the scope of the units were narrowed and

updated, and it was prepared considering the principle of reaching the content via science processes<sup>3)</sup> (Kaptan & Korkmaz, 2001). The program attached importance to also the improvement of scientific attitudes and it was student-centered. However, the science syllabuses were revised in 2004 and underwent a second change. The name of the course was made Science and Technology. The vision of the program was summarized in educating students as science and technology literates whatever their individual differences are. The main approaches while developing the program were, giving the gist in small amounts of information, dealing with all the dimensions of science and technology literacy, basing the learning and assessing activities on constructivist learning theory, revising and reviewing, parallelism to the syllabuses of other courses and conformity with students' physical and mental stages of development. The above mentioned last program has been followed in whole Turkey since the academic year of 2005-2006.<sup>4)</sup> There, science process skills were particularly emphasized to be the primary learning area.

### **Science process skills in the syllabus of science and technology course**

The basic process skills in the program were determined as Observing, Comparing and Classifying, Inferring, Predicting, Defining Operationally, Measuring, Recording and Interpreting, Formulating Models, Constructing Tables of Data and Graphs, while the integrated process skills were to be Formulating Hypotheses, Identifying and Controlling Variables and Experimenting.

The program specified<sup>3)</sup> also some acquisitions needed by students to improve their skills of researching and questioning with a scientific and technological point of view, solving problems, conveying scientific views and results, working in cooperation and deciding sensibly.

The purpose of this study was to investigate the effects of hands-on activities incorporating inquiry based science teaching on fourth, fifth, sixth, seventh and eighth grades students' science process skills and attitudes toward science lessons. It compared the performance of the students using hands-on activities incorporating inquiry based science teaching to students using a traditional science curriculum.

### **Research questions**

The study focused on two main problems and some related sub-questions has been provided to develop solutions to following research questions: (1) are there any effects of inquiry based science teaching on elementary school students' level of scientific process skills: i) are there any significant differences after the study on the elementary school 4th, 5th and 6th grade (10-12 age group) students' level of scientific process skills between the experimental and control groups; ii) are there any significant differences after the study on the elementary school 7th and 8th grade (13-14 age group) students' level of scientific process skills between the experimental and control groups; (2) are there any significant differences between the attitudes of experimental and control groups elementary school students towards Science Courses: iii) are there any differences after the study in the experimental and control groups 4th, 5th and 6th grade (10-12 age group) students attitudes towards science courses; iv) are there any differences after the study in the experimental and control groups 7th and 8th grade (13-14 age group) students attitudes towards science courses.

### **Methodology of research**

In the study, pre-test and post-test experimental design (control-experimental group) was used. The main study sample comprised 241 students in total. 71 of them constituted the experimental group for the 4th, 5th

and 6th grades and 68 students constituted the control group. The experimental group for the 7th and 8th grades was composed by 50 students while 52 students comprised the control group. When creating the experimental and control groups, it was aimed not to cause any distinct differences between the groups. To ensure this, SPST had been done before the study and then choices were made randomly in the classes that had similar performances to one another. Nearly all of the students had mid-level socioeconomic statuses. The study was conducted the one of the large elementary school in the city of Bursa. The school has 5 classrooms for each one of the 4<sup>th</sup> and 5th grades and 3 classrooms for each one of the 6th, 7th and 8th grades. Besides, there are science and mathematics laboratories in it. Study was conducted during the two semesters.

Science Process Skill Test (SPST): to measure the integrated science process skills, the test developed by Burns et al. (1985) with its 36 items was modified by the researchers with some particular changes and additions. So Integrated science process skills test (ISPST) redeveloped had 38 items. Besides that, another test basic science process skills test (BSPST) was developed in order to measure the basic science process skills of the 4th, 5th and 6th grade students (10-12 age group) and it consisted of 24 items. Thus, BSPST was administered to measure the basic science process skills and the ISPST was given to measure the integrated process skills of the 7th and 8th graders (13-14 age groups). For the pilot study, BSPST was applied to the 4th, 5th, and 6th grades students (ages 10-12) and the Cronbach's alpha reliability coefficient of the test was found to be 0.74, and ISPST was applied to the 7th and 8th grades students (ages 13-14) and the Cronbach's alpha reliability coefficient of the test was found to be 0.78.

BSPST, which has 6 dimensions, 6 items related to observation, 6 items related to classification, 6 items related to measuring, 8 items related to predicting, 4 items related to inferring and 4 items related to communicating. ISPST, which has 11 dimensions 6 items related to formulating hypothesis, 7

items related to identifying of variables, 7 items related to defining operationally, 6 items related to interpreting data, 4 items related to formulating models and 6 items related to experimenting.

Attitudes Scale towards Science (ASTS): this scale, developed by Oruç<sup>5)</sup> measures students' attitudes towards science and contains 40 items. The reliability of this scale was found to be 0.87.

Pre-test post-test control group design, which is one of the methods of the experimental design, is applied. All participants attended the three-hour lectures per-week in a science course. While the students in the control group were being taught by their teachers with traditional methods, the ones in the experimental group were supplied some hands-on activities prepared by the researchers to improve their science process skills. Throughout the studies, the topics to be studied were selected in conformity with the syllabus and what the control group students were studying. Throughout the year, the students did 108 hands-on activities to improve their science process skills. They worked in groups of at least 2 and maximum 4 students. The groups were heterogeneous with respect to their science achievement. Students in the experimental group were trained about inquiry teaching method and hands-on activities.

50 experiments set up were on physics subjects while 25 were about chemistry and 33 of them were on biology subjects. The numbers of the experiments are in proportion to the scopes of the units determined by the syllabus. The experiments were designed considering the levels of the students and the science process skills aimed to be given and improved. The numbers of the activities in all the grades are given in the Table 1.



**Table 1.** Numbers of the activities aiming to improve the skills in all the grades

SPS	Grades Level				
	4	5	6	7	8
Observing	16	22	18	10	8
Comparing and classifying	7	8	6	3	2
Inferring	11	20	14	7	4
Predicting	11	4	4	4	6
Measuring	10	10	12	18	10
Recording and interpreting	18	18	18	22	22
Formulating models	4	4	5	4	3
Constructing tables of data and graphs	11	4	4	7	9
Experimenting	-	-	-	6	6
Defining operationally	-	-	-	4	3
Formulating hypotheses	-	-	-	7	7
Identifying and controlling variables	-	-	-	6	6

During the studies, the students were asked some open-ended questions to attract their attention to the topics and activities and they were asked to answer them working cooperatively. At that stage, the students were often supported by the researchers. The groups were demanded their findings and results attained in writing or verbally whenever they finished working together. They write some group reports and different students in the work groups provided oral explanations to the rest of the students about each one of those reports. The findings were discussed all together to have some specific results. To consolidate things, the classification skill for example, the class was asked a common question on classification before ending the lesson.

Students all grade levels, the number of the hands-on activities, the content knowledge related to the science process skills, and the instructional time were held constant. Dependent variables of the study were the students' achievement scores of BSPST or ISPST and ASTS. Independent variables of the study were the different types of instructions employed.

When students' pre- BSPST and pre-ISPST scores and pre- ASTS scores were used as a covariate, ANCOVA was used to test the research questions and to determine the treatment effects on students' post- BSPST and post-ISPST scores and post- ASTS scores.

## Results

To determine the science process skills and attitudes of the groups before the experimental studies, a t-test analysis was made using their pre-test scores. Descriptive statistics for pre and posttest scores for the control and experimental groups on BSPST, ISPST and ASTS are given in Tables 2-5.

**Table 2.** Descriptive statistics for pre- and post BSPST scores for grades 4-6

Group	n	Pre- BSPST		Post- BSPST	
		Mean	SD	Mean	SD
Experimental group	71	10,9155	3,99552	14,0423	2,58256
Control group	68	10,8382	3,46673	12,2206	3,36286

**Table 3.** Descriptive statistics for pre- and post ISPST scores for grades 7 and 8

Group	n	Pre- ISPST		Post- ISPST	
		Mean	SD	Mean	SD
Experimental group	50	11,3800	3,34963	12,1200	4,31722
Control group	52	8,2500	3,76712	8,1923	4,59342

**Table 4.** Descriptive statistics for pre- and post ASTS scores for grades 4-6

Group	n	Pre-ASTS		Post- ASTS	
		Mean	SD	Mean	SD
Experimental group	67	163,0000	16,58312	165,5821	20,61564
Control group	69	159,3478	20,25922	156,1159	22,43457

**Table 5.** Descriptive statistics for pre- and post ASTS scores for grades 7 and 8

Group	Pre-ASTS			Post- ASTS	
	n	Mean	SD	Mean	SD
Experimental group	50	144,3600	23,07287	158,9400	20,75652
Control group	48	145,5417	21,39493	148,4375	19,92422

It is seen from the tables that the students' pre-BSPST scores (4<sup>th</sup>, 5<sup>th</sup> and 6<sup>th</sup> grades), pre- ASTS scores (4<sup>th</sup>-8<sup>th</sup> grades) were not significantly different between the control and experimental groups. ASTS scores were ( $t=2.554$ ,  $df=96$ ,  $p>0.05$ ) for 7<sup>th</sup> and 8<sup>th</sup> grades, and  $t=1.149$ ,  $df=134$ ,  $p>0.05$  for 4<sup>th</sup>, 5<sup>th</sup>, and 6<sup>th</sup> grades. BSPST scores were ( $t=0.122$ ,  $df=137$ ,  $p>0.05$ ) for 4<sup>th</sup>, 5<sup>th</sup>, and 6<sup>th</sup> grades. The only difference was found between the 7<sup>th</sup> and 8<sup>th</sup> grades' ISPST scores ( $t=4.428$ ,  $df=100$ ,  $p<0.05$ ).

Analysis of Covariance (ANCOVA) was used to test the effects of the instruction done with inquiry teaching on students' science process skills and attitudes towards science considering the pre-test scores as a covariate. Before making comparisons between the groups, the relationship between the dependent and independent variables was analyzed and it was tested whether the assumption that the tendency of the regression lines that are to be used to predict the post-test scores compared to pre-test ones are equal to one another is achieved through the data obtained from the study. According to the results of the analyses, the relationships between pre-test and post-test scores were found to be  $r=0.742$ , for the experimental group and  $r=0.740$  for the control group ( $p<0.01$ ) for the ISPST result scores belonging to the 7<sup>th</sup>, and 8<sup>th</sup> grades, and for the 4<sup>th</sup>, 5<sup>th</sup>, and 6<sup>th</sup> grades the BSPST result scores were  $r=0.419$  for the experimental group ( $p<0.05$ ) and  $r=0.636$  for the control group ( $p<0.01$ ).

Tables 6 and 7 show the summary of ANCOVA comparing the mean scores of students' performances in both the experimental and control groups with respect to the post- BSPST, post- ISPST and post- ASTS.

**Table 6.** Results of ANCOVA of post- BSPST scores of the students in control and experimental groups with respect to treatment

Source	Type III Sum of Squares	df	Mean Square	F	p
Pre-BSPST	302,531	1	302,531	44,623	,000
Treatment	111,405	1	111,405	16,432	,000
Error	922,033	136	6,780		

**Table 7.** Results of ANCOVA of post- ISPST scores of the students in the control and experimental groups with respect to treatment

Source	Type III Sum of Squares	df	Mean Square	F	p
Pre-ISPST	623,678	1	623,678	45,211	,000
Treatment	64,323	1	64,323	4,663	,033
Error	1365,679	99	13,795		

As seen in Table 6 and Table 7 pre-BSPST and pre-ISPST scores have significant effects on students' post-BSPST and post ISPST scores. Also Table 5 and Table 6 show significant treatment effects on students science process skills ( $F(1,136) = 16.432$ ,  $p < 0.05$ , and  $F(1,99) = 4.663$ ,  $p < 0.05$ ). As can be seen in these results, the students in the experimental group had a better performance in terms of BSPST and ISPST scores than the control group did.

In addition, it was found that there was no statistically significant interaction between treatment and gender on all test scores.

**Table 8.** Results of ANCOVA of post- ASTS Scores of the students (10-12-age group) in the control and experimental groups with respect to treatment

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Pre- test	18913,475	1	18913,475	58,012	,000
Group	1709,229	1	1709,229	5,243	,024
Error	43361,896	133	326,029		

**Table 9.** Results of ANCOVA of post- ASTS Scores of the students (13-14-age group) in the control and experimental groups with respect to treatment

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Pre- test	12024,169	1	12024,169	41,172	,000
Group	3013,272	1	3013,272	10,318	,002
Error	27744,464	95	292,047		

As seen in Table 8 and Table 9, pre-ASTS scores have significant effects on students post-ASTS. Also these Tables show significant treatment effects on students attitudes towards to science between the groups ( $F(1,133)=5.243$ ,  $p<0.05$ , and  $F(1,95)=10.318$ ,  $p<0.05$ ). As can be seen in these results, the students in the experimental group had a better performance in terms of ASTS scores than the ones in the control group did.

## Discussion

The first objective of this study was to compare the effects of hands-on activities incorporating inquiry-learning approach on the development of 4-6th grade students BSPST and attitudes toward science, 7-8th grade students ISPST and attitudes toward science.

The results given in Tables 2-5 suggest that the values about the experimental groups are higher than those about the control groups when comparing the average scores both 4-6th graders and 7-8th graders got about their process skills and attitudes towards science. Results of the study are consistent with results of similar studies previously conducted.

Many researchers have shown that hands-on activities incorporating inquiry based science teaching to science instruction will improve science attitudes and science process skills (Staver & Small,1990; Turpin & Cage,2004) and laboratories have long been recognized for their potential to facilitate the

learning of science concepts and skills (Hofstein & Lunetta, 2004). Anderson (2002) states that the previous studies indicate employing inquiry based science teaching in science education has some positive effects on cognitive achievement, process skills and attitude towards science but it is relative. Aktamış & Ergin (2008) found in their study to teach scientific process skills to students to promote their scientific creativity, attitudes towards science, and achievements in science. German & Odom (1996) conclude after a study with 7th grade students that students need to be taught with inquiry teaching techniques to be able to practice and develop the process skills and understand the goal of the experimental context in science. Turpin & Cage (2004) found in their study that activity-based methods had some effects on achievement in SPS but they did not found any changes in attitudes towards science courses, and they concluded that teacher behaviors are more influential on attitudes. Walter & Soyibo (2001) discuss the change in the science programs that are mainly based on hands-on and minds-on activities done in laboratories, and such programs are based on BSPS and ISPS. Their study suggests that the 7th, 8th and 9th grade students in the schools following the new program were more successful than those who were in the schools adopting traditional methods. Bilgin (2006) found that when hands-on learning activities are used together with cooperative learning approach, 8th grade students were more successful in SPS and had more positive attitudes towards science than the control group students following the traditional methods. Butts et al. (1997) reported that students needed more practices to be done in laboratories to improve their problem solving skills and SPS. Hartikainen & Sormunen<sup>6)</sup> sought an answer to the question “Why the scientific skills are not familiar to pupils?” What they suggested as answer was that teachers do not teach about science process skills first and encourage students to search. They offered some solutions for it, and some of them are that teachers might give well-defined research problems, completed questions, obvious hypotheses, receipt-like methods, and teachers should offer students

the possibility to plan their own investigations, where they make their own questions and hypotheses, choose methods and necessary equipment, discuss about the means for ensuring reliability and the ways of scientific reporting. In that way, the students can adopt a scientific skill, which means learning some fundamental features of the nature of science, and, consequently, even deepen their conceptual understanding of natural phenomena. Yager & Akçay (2010) indicated that student use and understanding of science skills and concepts in the inquiry sections increased significantly more than they did for students enrolled in typical sections in terms of process skills, creativity skills, ability to apply science concepts, and the development of more positive attitudes.

Teachers should first follow a program that would make students acquire the science process skills. Then they should integrate that program with the science curriculum since science process skills have a hierarchic structure. A student who does not have the basic skills could not improve the skills about performing experiments easily. Whereas, what we firstly do at schools is making students do experiments. That is starting from the end and a big mistake. For this reason, teaching science process skills should never be neglected giving such excuses as shortage of time and overloaded syllabuses.

Results of the present study show that hands-on activities incorporating inquiry based science teaching to science instruction will improve science attitudes and science process skills and support the fact that the new science and technology program followed in Turkey since 2004/2005 academic year is one that could make positive contributions to students achievement in science, scientific literacy and attitudes towards science.

The study was carried out in relatively crowded classrooms. The average population of the students per classroom was about 40 people. The lessons were given as based on hands-on activities under those conditions and the results achieved are particularly significant in that respect.

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#### NOTES

1. <http://www.narst.org/publications/research/skill.cfm>
2. <http://www.suite101.com/content/problem-solving-and-science-process-skills-a65807>
3. M.E.B. (2000), Science Course Teaching Program, *2518 sayılı Tebliğler Dergisi*, İstanbul: Milli Eğitim Basımevi.
4. <http://www.meb.gov.tr>
5. Oruç, M (1993). *Relationships of elementary school students' science achievement and science attitudes*. Ankara: Hacettepe University (unpublished MEd thesis).
6. Hartikainen, A. & Sormunen, K. (2003). Seventh-grade pupils' scientific process skills in biology context. Paper presented at the 4th International Conference of the European Science Education Research Association (ESERA).

#### REFERENCES

- Aktamış, H., Ergin, Ö. (2008). The effect of scientific process skills education on students' scientific creativity, science attitudes and academic achievements. *Asia-Pacific Forum on Science Learning & Teaching*, 9(1), article 4.
- Anderson, R.D. (2002). Reforming science teaching: what research says about inquiry. *J. Science Teacher Education*, 13, 1-12.
- Basaga, H., Geban, O. & Tekkaya, C. (1994). The effect of the inquiry teaching method on biochemistry and science process skill achievements. *Biochemical Education*, 22, 29-32.



- Brickman P, Gormally C., Armstrong N. & Hallar B. (July 2009). Effects of inquiry-based learning on students' science literacy skills and confidence. *Intern. J. Scholarship of Teaching and Learning*, 3(2).
- Brotherton, P.N. & Preece, F.W. (1995). Science process skills: their nature and interrelationships. *Research in Science & Technology Education*, 13, 5-11.
- Bilgin, İ. (2006). The effects of hands-on activities incorporating a cooperative learning approach on eight grade students' science process skills and attitudes toward science. *J. Baltic Science Education*, 1(9), 27-37.
- Burns, J.C., Okey, J.R. & Wise, K.C. (1985). Development of an integrated process skills test: tips II. *J. Research in Science Teaching*, 22, 169-177.
- Butts, D.P., Jackson, D. & Oliver, J.S. (1997). An evaluation study of the teaching of hands-on investigative biology in high schools "on a shoe-string". *Education*, 118, 133-44.
- Chang, C.Y. & Mao, S.L. (1999). Comparison of Taiwan science students' outcomes with inquiry- group versus traditional instruction. *J. Educational Research*, 92, 340-346.
- Chang C.Y. & Taipei, Y.H.W. (2002). An exploratory study on students' problem-solving ability in earth science. *Intern. J. Science Education*, 24, 441 – 451.
- Chiappetta, E.L. & Russell, J.M. (1982). The relationship among logical thinking, problem solving instruction, and knowledge and application of earth science subject matter: *Science Education*, 66, 85-93.
- Colley, K.E. (2006) Understanding ecology content knowledge and acquiring science process skills through project-based science instruction. *Sci. Activit.*, 43, 26-33.

- Cuevas, P., Lee, O., Hart, J. & Deaktor, R. (2005). Improving science inquiry with elementary students of diverse backgrounds. *J. Research in Science Teaching*, 42, 337-357.
- Ertepinar, H.& Geban, O. (1996). Effect of instruction supplied with the investigative-oriented laboratory approach on achievement in a science course. *Educational Research*, 38, 333-341.
- Gabel, D.L., Rubba, P.A. & Franz, J.R. (1977). The effect of early teaching and training experience on physics achievement, attitudes toward science and science teaching, and process skill proficiency: *Science Education*, 61, 503-511.
- Geban, O., Askar, P. & Özkan, I. (1992). Effects of computer simulations and problem-solving approaches on high school students: *J. Educational Research*, 86, 5-10.
- German, P.J. & Odom, A.L. (1996). Student performance on asking questions, identifying variables, and formulating hypotheses. *School Science & Mathematics*, 96, 192-202.
- Harlen, W. (1999). Purposes and procedures for assessing science process skills. *Assessment in Education: Policy & Practice*, 6, 129- 145.
- Hofstein, A. & Lunetta, V.N. (2004). The laboratory in science education: foundation for the 21st century. *Science Education*, 88, 28-54.
- Kaptan, F. & Korkmaz, H. (2001). The comparison of being implemented science curriculum with science curriculum will have been implementing for 2001-2002 academic year. *Çağdaş Eğitim Dergisi*. 273, 33-38.
- Ketpichainarong W., Panijpan B. & Ruenwongsa, P. (2010). Enhanced learning of biotechnology students by an inquiry-based cellulase laboratory. *Intern. J. Environmental & Science Education*, 5, 169-187.

- Keys, C.W. & Bryan, L.A. (2001). Co-constructing inquiry-based science with teachers: essential research for lasting reform. *J. Research in Science Teaching*, 38, 631-645.
- Mabie, R. & Baker, M. (1996). A comparison of experiential instructional strategies upon the science process skills of urban elementary students. *J. Agricultural Education*, 37(2), 1-7.
- Mao, S.-L., Chang, C.-Y. & Barufaldi, J.P. (1998). Inquiry teaching and its effects on secondary-school students' learning of earth science concepts. *J. Geoscience Education*, 46, 363-368.
- Minner, D.D., Levy, A.J. & Century, J. (2010). Inquiry-based science instruction - what is it and does it matter? Results from a research synthesis years 1984 to 2002. *J. Research in Science Teaching*, 47, 474-496.
- Olson, S. & Louks-Horsley, S. (Eds.) (2000). *Inquiry and the national science education standards: a guide for teaching and learning*. Washington: National Academies Press.
- Ostlund, K.L. (1992). *Science process skills: assessing hands-on student performance*. New York: Addison-Wesley.
- Pratt, H. & Hackett, J. (1998). Teaching science: the inquiry approach. *Principal*, 78(2), 2-20.
- Rezba, R.J., Sprague, C., Fiel, R.L., Funk, H.J, Okey, J.R & Jaus, H.H (1995). *Learning and assessing science process skills*. Dubuque: Kendall/Hunt.
- Staver, J.R & Small, L. (1990). Toward a clearer representation of the crisis in science education. *J. Research in Science Teaching*, 27, 79-89.
- Turpin, T. & Cage, B.N. (2004). The effects of an integrated, activity-based science curriculum on student achievement, science process skills, and science attitudes. *Electron. J. Literacy through Science*, 3.

- Walters, Y.B. & Soyibo, K. (2001). An analysis of high school students' performance on five integrated science process skills. *Research in Science & Technological Education*, 19, 133-145.
- Wilke, R.R. & Straits, W.J. (2005). Practical advice for teaching inquiry- based science process skills in biological sciences. *American Biology Teacher*, 67, 534-540.
- Yager, R.E. & Akçay, H. (2010). The advantages of an inquiry approach for science instruction in middle grades. *School Science & Mathematics*, 110, 5-12.

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# USING INTERNET TECHNOLOGIES IN LEGAL PRACTICES AND STUDIES IN RUSSIA

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**Abstract.** This paper is devoted to the agenda of using computer and Internet technologies in legal practices and studies in Russia. Despite the obvious necessity for professionals to learn English, many graduates in Russia still demonstrate a very poor command of this universal language. And it has become quite impossible for a lawyer (or for any other specialist) to work effectively without using the Internet and for a student – to study and to practice a foreign language.

*Keywords:* language studies, legal studies, law, Internet technologies

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It is no secret that new technologies made it possible for professionals in Russia to communicate on an international level. It happened mostly due to certain political and economical changes in the country that in turn led to diversification, unrestricted information interchange and distribution of foreign scholarly and educational press. Thus proficiency in foreign languages obviously opens up new educational, cultural and professional possibilities.

And it is especially important to have a good command of English – the language of international communication.

English is the main language of scholarly press, business negotiations and documents. Moreover it would be quite impossible to use computer technologies in general and Internet technologies in particular if you do not know this universal language.

However despite the obvious necessity for professionals to learn English, many graduates in Russia still demonstrate a very poor command of this language. One of the main reasons for such unfortunate circumstance is the lack of motivation to study any foreign language, as well as limited educational resources. In other words, a modern teacher of a foreign language in a Russian institution of higher education will inevitably come to the conclusion that traditional forms of interacting with students ought to be changed and changed radically (Kress, 2003). Let me try to examine this problem in relation to law students.

Does a lawyer need to have a good command of a foreign language? It is a rhetorical question – he or she certainly does. But does this lawyer need to know how to work with the Internet? Twenty years ago many lawyers in Russia still did not know anything about the existence of computers, notwithstanding e-mails and web-searches. Is this an excuse for today's mass computer illiteracy? This is definitely not. The world has changed and the people must change with it. And it has become quite impossible for a lawyer to work effectively without using the Internet and for a student of law – to study and to practice a foreign language.

World Wide Web opens for its users the universe of unlimited opportunities. A lawyer who has a good command of the English language and is a confident Internet user will always be able to contact his foreign colleagues promptly, to find a required statute in a foreign legislative data base, e.g.<sup>1)</sup> or to take part in an international teleconference. In other words,

Internet helps lawyers to work more proficiently. But what about students - does it help or distract? (Prichard, 2007).

Many teachers believe that students use Internet solely for idle talking or for downloading somebody else's papers (Sutherland-Smith, 2008). Is this really so? Let us not be so maximalistic and unfair. The problem is that in Russia many institutions of higher education have no opportunity (due to certain financial difficulties) to subscribe to foreign press and purchase new books. It is obvious that in this case most students of law of such universities will not be able to work with new publications in the world of international legal literature and will not be able to read many interesting legal articles published in foreign newspapers and magazines.

Thereby we can be sure that Internet helps students to practice foreign languages, because even to find a certain article on the web-site of "The Times" newspaper one needs to have a good command of English language.

At the present moment the legal Internet of the United States of America is considered to be the most developed on the Web. Any lawyer or any law student who demonstrates a high level of language competence will be able to work with the data in the legislative data base, find by-laws, general legal news and information on government services. It is not necessary to mention the importance of such resources for the students specialising on the legal system of the United States of America. In American e-libraries students can find reports on almost all trials that have taken place in the USA since 1990. For example Legal Information Institute: Supreme Court Collection features a collection of nearly all opinions issued since May 1990, as well as a current schedule, a gallery of justices, and a glossary.<sup>2)</sup> Besides some basic information on trials and judiciary panel, such web-sites also feature different background and reference materials, concise dictionaries of law, information on non-governmental and nonprofit organizations dealing with legal issues, etc. Such catering for ordinary people (including those who

are not the residents of the United States of America) is typical of all governmental resources of the legal American Internet.

It is also noteworthy that according to the American legislation agreements and contracts concluded over the Internet are valid. What is more, at the moment law-makers are discussing the possibility of holding trials online. Therefore the importance of a modern lawyer having a good command of the English language and using international legal resources effectively is almost vital. Of course, there is a chasm between the developed online legislature of the United States of America and feeble attempts to streamline these fields of activity in Russia. Though the situation is not hopeless and the prospects are rather optimistic. The government of the Russian Federation with the assistance of the President of the Russian Federation is taking steps to introduce online technologies into all public domains. Such strategy is supported by the federal goal-oriented programme “Russia Online” (“Elektronnaya Rossia”) which was elaborated to provide a regulatory legal database in the sphere of information and communication technologies, develop the information and telecommunication infrastructure, form the conditions for unlimited and accessible Internet connection and guarantee the effective interaction between government and local authorities and citizens and managing subjects.<sup>3)</sup>

However it does not mean that students studying law in Russia should not pay attention to language studies. On the contrary, now in the age of educational globalization it is high time the language barrier was surmounted. Unfortunately the level of language training in non-linguistic universities is usually very low. Students in general and law students in particular undoubtedly need to acquire basic skills of reading simple foreign texts and translating them into Russian, and such skills might even be enough to fulfill oneself in Russia, but they are definitely not enough to collaborate effectively with international organizations.



Evidently the process of educational globalization presumes that students of non-linguistic universities need adequate language training. That is why the main goal of a modern language teacher in Russia is to use foreign Internet resources in the course of language training and to motivate students to use such resources in their everyday life. But here we face another problem.

No one really knows how many people are using the Internet. It is so popular that it would be quite impossible to carry out a survey to find this out. That is why no one can say for sure whether professors (language teachers in particular) in Russia are using this technology and how it is being used.

According to teachers' feedback - at conferences, in papers and discussion forums - they seem to use Internet for just about everything: development, updating language skills, finding materials, keeping in touch with friends and colleagues, teaching, working on class projects and activities, etc. Nowadays, when it is almost impossible to live and communicate without a computer and computer technologies are becoming increasingly available in schools and universities around the globe, it is high time Russian teachers started making long-range plans for the use of computer and Internet technologies at all levels of education. It means that teachers must not only know how to use the technology, but be able to use it creatively.

The Internet allows both teaching professionals and students almost instant access to a vast amount of materials, as well as detailed information about many educational institutions and distance-learning courses currently available worldwide. Clearly, this is faster and much more convenient than 'traditional' methods of finding the same information.

Moreover, any teacher may publish his/her materials on the Web and even create a course web site which might include for example a syllabus, a summary of lessons, notes, links to helpful sites and related research, projects done by students, assignments and many other useful materials. The interactivity of the Web allows for spontaneous feedback and helps saving

time and effort. Communication with the teacher is more efficient this way and questions can be handled and problems resolved more swiftly. Besides it is much easier to send assignments by e-mail than hand out the copies.

Of course the Internet cannot replace the classroom, or the teacher - or in fact, any of the other classroom tools that are currently in use. But it is indispensable as a source of material and an instrument for communication. In addition, the Internet has the advantages of providing up-to-date, authentic material in English (or any other foreign language), and opportunities for real communication with native and non-native speakers. It can also allow students to discover language for themselves in a more immediate way than by reading a textbook.

However, integrating technology into the classroom is not about the technology itself, but about more effective teaching and learning. Thus a teacher must not only be proficient in using computer technologies but possesses certain knowledge and skills without which it would be quite impossible to apply technology in educational environment. So it makes perfect sense that all teachers (regardless of the subject they specialise in and educational institution they work for) should meet some general education technology standards. Such knowledge and skills will definitely help them to plan and design effective learning environments and evaluation strategies that address the diverse needs of students.

Our present goal is to teach students to think critically, analyse information, communicate and work in teams, as well as to solve technical, social, economic, political, and scientific problems. Integrating information resources of the Internet and computer technologies into the modern educational process is inevitable. Modern teacher must be a technologist, evaluator, and co-learner.

Unfortunately today media literacy in Russia is not compulsory (except for some secondary schools on an experimental basis and media

orientated universities and faculties) and is facing numerous financial and technical difficulties. And though Russian education authorities are definitely enthusiastic about new media opportunities, many our schools and universities just do not have the money for modern audiovisual and Internet equipment, not to mention the fact that there are still lots of teachers who have not heard about Internet education and its possibilities. Which obviously means that there are actually few people in the field who can teach students to work with original Internet resources and, sadly, most of these few live in such large cities as Moscow and Saint Petersburg? In many cases students know much more about new technologies and use them much more effectively, than teachers.

Therefore for the time being extensive use of Internet technologies, especially in language and law studies and practices, is just a long-term outlook.

#### NOTES

1. <http://portal.unesco.org>
2. <http://supct.law.cornell.edu/supct/>
3. <http://www.elrussia.ru/>

#### REFERENCES

- Kress, G. (2003). *Literacy in the new media age*. London: Routledge.
- Pritchard, A. (2007). *Effective teaching with Internet technology: pedagogy and practice*. London: Sage.
- Sutherland-Smith, W. (2008). *Plagiarism, the Internet and student learning: improving academic integrity*. New York: Routledge.

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# **ПРИНОСЪТ НА ФОНД "НАУЧНИ ИЗСЛЕДВАНИЯ" ЗА РАЗВИТИЕТО НА НАУКАТА В БЪЛГАРИЯ И ОСНОВНИ ИЗИСКВАНИЯ ЗА НЕГОВАТА ДЕЙНОСТ<sup>1)</sup>**

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**Резюме.** Статията описва създаването и развитието на Националния фонд “Научни изследвания”. Маркирани са три основни етапа в развитието на фонда. В първия етап са премирани със скромно финансиране тематични проекти в основните научни области. Вторият етап е свързан с приемането на Закона за насърчаване на научните изследвания в България (2003 г.). Недостатъците на този закон са анализирани. Третият етап включва годините 2008 и 2009. В този етап фондът за пръв път разполага със значително финансиране на конкурсните си сесии, които са разнообразни по тематика и много на брой. В реализацията на тези конкурсни сесии са допуснати редица организационни и методични грешки, които хвърлят сянка на получените резултати. Причините за този провал са анализирани и са посочени мерките, прилагането на които би предовратили тяхното повторение в бъдеще.

*Keywords:* research projects, Bulgarian Science Fund, normative basis, peer evaluation

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## Увод

В България има силна научна традиция. Несъмнено два са стожерите на българската наука – Софийският университет „Св. Климент Охридски” и Българската академия на науките. „Създаден наскоро след Освобождението, крепен и издиган с благородните усилия и упорития труд на първите наши ратници в полето на науката и просветата, днес Българският държавен университет „Св. Климент Охридски” е средище на планомерна творческа работа във всички области на човешките знания. Той успява да създаде достойни представители на науката и внася своя дан в световната научна съкровищница”.<sup>2)</sup> [Българската академия на науките] е един „нов храм, в който най-видни представители на родната мисъл и творчество ще продължават да развиват и разпространяват науките и изкуствата, ще ратуват за българската книжнина и ревниво ще пазят и разработват най-скъпия завет от нашите прадеди – родният език”.<sup>3)</sup> Тези думи на българския цар, казани през 1939 г. и 1926 г., съответно, са израз на отношението на българския народ към науката и нейните представители. Днес отношението на българското общество и на политическите му водачи към науката и учените изглежда променено. Все още липсва дълбокият анализ, който да покаже какво се случи в последните 60 години, та българската научна колегия днес да показва белези на разединение и дълбоко смущение. Защо някои от европейските корени на българската наука бяха прерязани, а други залиняха. Развитието на модерната наука изисква обществена подкрепа и добро финансиране. По общо мнение нито едното, нито другото днес е налице. Институционалното финансиране на научната дейност навсякъде по света бе заменено с проектното финансиране. Този доклад е за въвеждането и приложението на проектното финансиране на научната

дейност, осъществено главно чрез Националния фонд „Научни изследвания”.

### **Кратки сведения за обезпечаването на научната дейност в Германия**

Европейските традиции на българската наука в голяма степен са свързани с германската научна традиция. Затова като втори увод към днешната тема изглежда не е излишно да се дадат няколко кратки сведения за това как днешна Германия подкрепя чрез системата на проектното финансиране научната дейност на своите научни организации (Тошев, 1999).

За Германия основна полуправителствена финансираща научните изследвания организация е създадената през 1920 г. Германска научно-изследователска фондация, DFG. Тази организация чрез проектното финансиране подпомага германските университети във всички области на науката и обръща специално внимание на подготовката на новите поколения изследователи. DFG представя германската наука в международните организации и нейна важна функция е да съветва парламентите и властите по въпроси, отнасящи се до развитието и ролята на науката.

Дружеството Макс Планк – Max-Planck-Gesellschaft, е основано през 1911 г. под името „Кайзер Вилхелм”. За 2009 г. годишният бюджет на дружеството е 1300 млн евро, институтите на дружеството са 80 с 4889 щатни изследователи и още 7051 чужденци - гост-изследователи и стипендианти. Смята се, че успехът на дружеството Макс Планк е в последователното стогодишно прилагане на т.н. принцип на фон Харнак (Адолф фон Харнак е първият председател на дружеството Кайзер Вилхелм) – институти се създават не в области, които изглеждат необходими и перспективни, а около личности с изключителни научни

постижения. Друга особеност на дружеството е тясната му връзка с университетите – дава се възможност на водещи университетски професори за период от 5 години да оглавяват изследователски групи в Макс Планк институтите.

Дружеството Фраунхофер – Fraunhofer-Gesellschaft, обединява 60 институти за приложни и инженерни изследвания, които са в тясна връзка с индустрията. Годишният бюджет на дружеството (2010 г.) е 1650 млн евро, от които 1400 млн евро се разпределят чрез проекти на конкурсен принцип.

Германия сега има 17 центрове Хелмхолц, обединени в асоциация с годишен бюджет от 3300 млн евро. Предназначението на тази формация е развитието на високите технологии и изграждането и поддържането на едро-машабните установки, което не е по възможностите на традиционните университетски структури.

Федералното правителство и провинциите поддържат и 83 различни по характера си институти, обединени в дружеството Готфрид Вилхелм Лайбниц – академии, федерални и провинциални институти, музеи в различни области на науката.

### **Създаване и първи етап в развитието на Националния фонд „Научни изследвания”**

Националният фонд „Научни изследвания” е създаден на 1 юли 1990 г. (Постановление № 83 от 26 юли 1990 г.).<sup>4)</sup> С този акт се закрива съществуващият по-рано Фонд „Научни изследвания”. Националният фонд „Научни изследвания” е създаден като подразделение на вече несъществуващото Министерство на науката и висшето образование. По-късно принципал на Фонда става Министерството на образованието и науката, което чрез дирекцията си „Научни изследвания” осигурява административно и методично дейността на Фонда. Предметът на

дейност на Националния фонд „Научни изследвания” е определен по следния начин: „финансиране и подпомагане на научните изследвания и оценка на резултатите от тяхното провеждане; организиране и подпомагане на международното научно сътрудничество”.<sup>4)</sup>

Основен принцип на проектното финансиране е състезанието чрез научни проекти. Фондът обявява годишни конкурси в отделни области на науката и оценката на постъпилите проекти, както и на отчетите на етапите по сключените договори се осъществява от научно-експертни комисии. Тези комисии по правило са формирани след предложения на базовите научни организации и включват квалифицирани в по-тесни области от по-широката научна област специалисти. Оценките се извършват чрез експертни карти, които в годините търпят известни промени в своите раздели и изисквания. Например в първите години, когато научните организации трябваше да полагат усилия за преодоляване на блоковото разделение на науката, международното сътрудничество се вземаше под внимание с особено тегло. Тогава се търсеше документирано участие на чужди специалисти в българските научни колективи. Участието на млади изследователи и студенти в научните проекти винаги се е поощрявало и награждавано в крайните оценки. В годините особено важният раздел „научен капацитет” претърпя известна еволюция – от вземане под внимание на всякакви публикации за доказване на научна компетентност до градиране на представените публикации с особен акцент върху публикациите в издания, които са обект на индексирание и рефериране и особено място в оценките на тези издания, които имат импакт фактор. В анкетните карти винаги е имало раздел „възможност за приложения в практиката”, но този раздел винаги се е попълвал формално („има възможност”), но Фондът никога не е проверявал дали заявените в проектите намерения за практическа реализация на очакваните резултати в последствие са



намерили някакво покритие. В този период научно-експертните комисии са използвали при оценъчните процедури и външни български рецензенти. В някои от тези години е създаван и панел от такива евентуални рецензенти, но никога външните рецензенти не са били специално подготвяни за работата, която трябва да вършат. За някои от годишните конкурсни сесии на Фонда е имало разяснителни кампании, често във връзка с разяснителните кампании за участието на българските учени в рамковите програми, след 4-та и 5-та, на Европейската комисия. Оценката на предложените проекти винаги е имала числов израз и за дълъг период от време, ако оценките на експерта от комисията и тази на външния рецензент се различават с 13 и повече точки, тогава комисията е назначавала трети рецензент и крайната оценка на проекта е определяна по специална формула. Комисиите имат административен секретар от щата на Министерството. Тези секретари в този период са с добра подготовка, често с базисно образование в профила на комисията. Повечето от тях познаваха детайлно съответните научни общности в областта на химията, техническите науки, физиката, биологичните науки, медицината, селскостопанските науки и т.н. и това в голяма степен улесняваше дейността на научно-експертните комисии. Фондът, както в тези години, така и досега, не е търсил връзка между отделните научно-експертни комисии за уеднаквяване на критериите за оценка в отделните научни области. Но в определен период от време всяка година два пъти в годината неформални срещи между председателите и секретарите на експертните комисии и ръководството на Фонда са били провеждани за обсъждане на промени в анкетните карти и съгласуване на оценъчните процедури. Това бяха срещи, организирани в Министерството на образованието и науката, от председателите на две комисии – комисията по технически науки и комисията по химия. Комисиите са изготвяли класации на участващите проекти според

точките, които тези проекти са получили. Броят на успешните проекти е в зависимост от паричната квота за дадената конкурсна сесия, определена с решение на Управителния съвет на Фонда. При това положение „пропускливостта” на представените проекти рядко е била по-голяма от 40 %, което разбира се е пораждало недоволство и възражения от страна на неуспелите кандидати. Комисиите са били длъжни да разглеждат внимателно всяко постъпило възражение. Естествено оценъчната документация (без имената на рецензентите) винаги е била на разположение на ръководителите на проекти. Особеност на конкурсните сесии от този период е една полезна практика, която по-късно вече не се прилага – всяко предложение за класация и финансиране се защитава обосновано в Управителния съвет на фонда от председателите на съответните научно-експертни комисии. Големият недостатък в работата на Фонда в този период е скромното финансиране на спечелилите състезанието научни проекти – в някои години от 500 до 3000 лв за работна година.

### **Втори етап в дейността на Националния фонд „Научни изследвания” – Закон за насърчаване на научните изследвания**

Приемането на Закона за насърчаване на научните изследвания<sup>5)</sup> през 2003 г. маркира вторият етап от развитието на Националния фонд „Научни изследвания”, който в този закон неоснователно е понижен в ранг и наречен Фонд „Научни изследвания”. Според Закона Фондът продължава да бъде „второстепенен разпоредител с бюджетни кредити към министъра на образованието, младежта и науката”, но получи известна самостоятелност и започна да изгражда собствен административен капацитет и придоби самостоятелна сграда, където да разположи своите структури. Едва през 2010 г. Фондът престана да разчита на аташираните към него сътрудници на Дирекция „Научни

изследвания” в Министерството на образованието, младежта и науката и започна предаването на всички архиви от Министерството към Фонда – процес, който днес изглежда завършен.

Органи на управление на Фонда са изпълнителният съвет, председателят и управителят. Председателят на Изпълнителния съвет се избира измежду неговите членове за срок от две години без право на два последователни мандата. Министърът на образованието, младежта и науката, съгласувано с Изпълнителния съвет, сключва договор за управление с Управителя на Фонд „Научни изследвания” и определя възнаграждението му. Според последната промяна<sup>6)</sup> на Закона за насърчаване на научните изследвания от 2010 г. Министърът на образованието, младежта и науката трябва да издаде правилник за наблюдение и оценка на научноизследователската дейност на научните организации и висшите училища, както и на дейността на Фонд „Научни изследвания”. Понастоящем една работна група в Министерството подготвя тази система за оценка, която ще бъде в основата на въпросния правилник. Законът не предвижда други връзки на Фонда с Министерството, така че Фондът „Научни изследвания” не може да се разглежда като финансов отдел или каса на Министерството.

Според Закона за насърчаване на научните изследвания оценъчните процедури във Фонда се осъществяват от временни и постоянни научно-експертни комисии. Временните комисии организират оценяването и осъществяват класирането на кандидатстващите в конкурсите на Фонда проекти, а постоянните комисии извършват анализ и оценка на изпълнението на финансираните научни проекти. Това разделяне на оценъчните функции между различни по състав експертни комисии не изглежда целесъобразно, защото има принцип, че този, който е оценил и класирал научния проект, трябва да следи и по-наташното му

развитие. Затова съществуването на временните научно-експертни комисии изглежда излишно.

Приходите на Фонд „Научни изследвания” се набират от следните източници: субсидия от държавния бюджет, собствени приходи от интелектуални права или патенти, дарения и помощи от организации или физически лица, постъпления от лихви върху средствата на фонда. Нормално е Фондът ежегодно публично да отчита своите приходи, но това очевидно не се прави. Впрочем Фондът не поддържа собствена страница в Интернет и не издава онлайн бюлетин с текуща и важна за научната общност информация. Така че днес ние не знаем дали освен държавната субсидия Фондът някога е получавал някакви дарения и дали българската индустрия участва или е съветвана да участва в събирането на средства за Фонд „Научни изследвания”, въпреки че Фондът по закон е задължен да подпомага приложните изследвания в България.

Въпреки че Законът за насърчаване на научните изследвания претендира, че е част от европейското право, той е между законите, които нямат осезаем принос в развитието на обществените процеси в България. Такъв принос се очаква с най-голямо основание в научната сфера, защото българската научна общност трябва да преодолее последиците от блоковото разделение на науката, да напусне периферията на науката в смисъла на Shils (1975) и най-накрая да приеме, овладее и прилага модерните международни стандарти за научна дейност. Поради редица несъвършенства и концептуални грешки Законът за насърчаване на научните изследвания не стимулира такова развитие. Подробният анализ на Закона за насърчаване на научните изследвания е във от темата на настоящия доклад. Но няколко примера не са излишни. Законът е предвидил създаването на Национален съвет за наука и иновации, който да участва в разработването на Националната

стратегия за научни изследвания и да изготвя доклад за състоянието на научните изследвания и научното сътрудничество. Някой да има някаква индикация за свършеното от 20-те члена на този съвет. Законът определя националните приоритети в науката по следния начин: решаване на важни проблеми на страната в областта на икономиката, обществените процеси и човешките ресурси; националната идентичност, българската история и култура; развитието на инженерните науки и иновациите; създаването на нови научни звания. Това разбира се е концептуална грешка, защото преди определянето на каквито и да било приоритети, преди формирането на национална научна стратегия с включването на елементи, които изглеждат необходими и полезни, е нужно установяване на реалната научна компетентност в различните области на науката в България. Защото ние можем да оценим, че нещо е важно в дадения момент, но анализът да покаже, че ние нямаме нужния научен капацитет, за да го реализираме с нужното качество. В световното научно пространство има поле на науката и поле на „науката” (сурогатната наука). С масовизацията на висшето образование се масовизира и научната дейност, при което полето на сурогатната наука се увеличава. Науката е продукт на човешката цивилизация и няма национален характер (въпреки че национални теми могат да бъдат обект на научен анализ). Тялото на науката се гради от новите научни резултати, които трябва да бъдат публикувани така, че да се гарантира широката им публичност, т.е. науката е насочена „навън”. Сурогатната наука е насочена „навътре” – публикува се, но в издания, които не осигуряват публичност на претенциите на авторите и по правило тези публикации са познати на малък кръг хора и се използват единствено в кариерното развитие на техните автори. Ролята на държавата е да осигури инструменти за разширяване на полето на разпознаваемата наука в България и свиване на полето на неразпознаваемата (сурогатната,

„домашната“) наука в България и едва на тази основа трябва да се формира краткосрочната и дългострочната държавна политика в областта на научната дейност.

### **Трети етап в дейността на Фонд „Научни изследвания“: Възход и падение (2008, 2009 гг.)**

През 2008 г. и 2009 г. Фонд „Научни изследвания“ разшири мащабно своята дейност като увеличи много броя на провежданите конкурсни сесии – те станаха 14 и осигури значително финансиране на класираните проекти. Между обявените конкурсни сесии са: Насърчаване на научните изследвания в приоритетни области (тематичен конкурс); Идеи; Млади учени; Развитие на научната инфраструктура; Развитие на центрове за върхови постижения; Университетски научноизследователски комплекси; Стипендии за млади учени, които подготвят докторантски труд в предприятие; Стипендии за постдокторантски стаж в чуждестранни научни организации; Сабатична година за български учени; Стипендии за завръщане на български учени, работещи в чужбина. Тематиката на обявените конкурси е разнообразна като се наблюдава стремеж за покриване на всички аспекти на английския термин R&D (Research & Development): фундаментални научни изследвания, индустриални научни изследвания и експериментално развитие. Използвани са следните дефиниции, които не изглеждат добър превод от английски от някои от документите на Европейската комисия: *фундаментални научни изследвания* са експериментална или теоретична работа, предприета основно с цел придобиване на нови знания за фундаменталните причини за явленията или наблюдаемите факти; *индустриални научни изследвания* означава планирани научни изследвания или проучвания, насочени към придобиване на нови знания и умения за разработване на нови продукти,

процеси или услуги; *експериментално развитие* означава придобиване, съчетаване, оформяне и използване на съществуващи научни, технологични, стопански и други релевантни знания и умения с цел създаване на планове и условия или конструкции за нови, модифицирани или усъвършенствани продукти, процеси и услуги. Изглежда ясно, че Фондът „Научни изследвания” би трябвало да осигурява научната дейност в България. Получаването и събирането на конкретни експериментални данни, дори когато това става с научни средства и методи и особено, когато за тези данни няма ясно изразена социална поръчка, не би трябвало да се финансира от българския научен фонд. Би могло да се препоръча експерименталното развитие да не се финансира от Фонда „Научни изследвания” – тази дейност би трябвало да се подпомага от съществуващия фонд „Иновации”, както и от специализирани индустриални фондове с прякото участие на българския бизнес и индустрия.

Проектите за финансиране са на основа на базова научна организация. Дефиницията на научна организация трябва да се прецизира, за да се предотврати неправомерното използване на парични средства – очевидно е, че институцията по проекта трябва да притежава собствен научен капацитет, което включва собствена научна инфраструктура и академичен състав на основен трудов договор. Така се изключват структури, създадени по Търговския закон за консултантски или други услуги или обединения с обществено-полезна дейност, които за изпълнение на своите дейности ангажират с граждански договори наети друге лица. Тази бележка е основателна, защото в конкурсните сесии през 2008 и 2009 г. за базови организации на класирани проекти (често много скъпи) са посочени и такива структури, например „Иновационен център за обучение” (проект: „Етнопсихологопедагогически модел на взаимодействието дете-учител-

родител за стимулиране социокултурната компетентност в полето на националното многообразие”); „Виджи Продуктс” (проект: „Разработване на база данни с визуални речеви сигнали на български език”); „ГИС – Трансфер Център” (проект: „Оптимизиране и приложение на модел и инструменти за интензифициране на взаимодействието наука-бизнес в подкрепа на силна и конкурентна българска индустрия”; „Агенция за социални анализи” (проект: Европейско социално изследване в България: нови сравнителни измервания”); „Дружество ЛИК” (проект „Модерни и постмодерни дискурси на четенето в България”); Атлантически клуб в България” (проект: „България и космическото право – поглед напред); „Болкан Бритиш Соушъл Сървейс АД” (проект: „Моделиране на информационна система от нов тип за изследване на човешкото поведение”) и други подобни структури.

През 2010 г. със Заповед на Министъра на образованието, младежта и науката, по предложение на тогавашния управител на Фонд „Научни изследвания”, бе формирана една работна експертна група, която е получила задача да провери детайлно дейността на Фонда „Научни изследвания” в годините 2008 и 2009. Председателят на тази работна група е от Софийския университет „Св. Климент Охридски”, останалите членове на групата са от Българската академия на науките (5), Нов български университет (1) и Софийски университет „Св. Климент Охридски” (1). Групата е предала на заявителя своя обширен доклад на 11 ноември м.г. Тъй като този доклад още не е получил публичност, изглежда неуместно неговото представяне тук. Може, обаче, да се каже, че този доклад, озаглавен „Върху реализацията на конкурсните сесии на Фонд „Научни изследвания” през 2008 г. и 2009 г.” предлага подробен анализ на реализацията на конкурсните сесии на Фонда през тези години. Прегледът на голям брой документи в печатен и



електронен вид и разговорите с всички отговорни длъжностни лица показват редица несъвършенства, грешки и възможни злоупотреби в тогавашната практика на Фонда. Два са главните проблема, които в голяма степен очертават компрометиране на дейността на Фонда в тези години: 1. Хаотично събиране на голям масив от чуждестранни рецензенти без проверка на заявената от тях научна компетентност и предоставената им възможност сами да избират проектите, които искат да оценяват – така са се появили рецензенти от страни като Румъния, Молдова, Сърбия, Хърватска, Литва, Турция, някои от които нямат научни степени и не заемат академични длъжности, а всекиму е ясно, че притежаването на образователно-квалификационните степени бакалавър или магистър или учител не може да бъде основание за провеждане на научни експертизи; 2. В скъпите инфраструктурни проекти основният принцип на проектното финансиране – състезанието – липсва – всички подадени проекти печелят.

Докладът ясно посочва причините за случилото се и сочи какво трябва да се направи за да се избегнат такива повторения в бъдеще. Нарушенията и организационните дефекти се дължат на три главни причини: 1) недостатъчен административен капацитет на Фонда в това време; 2) кампанийност в работата в условията на остър дефицит на време и 3) липса на всякакъв научен капацитет на Фонда. Последната причина е особено важна. Фондът не е направил необходимото, за да установи дали неговите рецензенти, особено тези от странство, имат реална научна компетентност, което при модерното развитие на научната комуникация е проста задача за хора с опит в науката, и още Фондът не е направил нищо, за да подготви своите рецензенти за дейността, която им предстои.

Би било пресилено да се твърди, че конкурсните сесии на Фонд „Научни изследвания”, проведени със значителен финансов ресурс през

2008 и 2009 г., са провал за българската наука. В редица случаи са финансирани значими изследователски проекти, предложени от силни изследователски групи при ясна индикация за спазване на международните стандарти на съвременната научна дейност. Със сигурност може да се твърди, че, особено в тези години, с помощта на Фонда вече са реализирани важни и дългосрочни инфраструктурни подобрения в научната база на българските научни институции. Създадени са консорциуми между българските научни организации за съвместно използване на скъпа и модерна научна апаратура. Привлечени са много млади изследователи и студенти в дейностите по реализацията на научните проекти. Установени са нови научни връзки с водещи научни организации в чужбина.

Би могло да се направят редица препоръки за усъвършенстване работата на Фонда „Научни изследвания” в интерес на българската научна общност. Това, което сега изглежда особено важно, е подобряването на административния капацитет на фонда и конструирането на научен директорат към Фонда с научни секретари в основните научни области в подкрепа на управителя и Изпълнителния съвет на Фонда по отношение на научното осигуряване на дейността на фонда, за да може той в пълна мяра да изпълни мисията си по осъществяване на политиката на държавата в областта на научната дейност и висшето образование. В задълженията на този съвет би трябвало да влизат: създаването на панел от български и чуждестранни рецензенти с проверена научна компетентност, прецизирането на експертните карти в отделните конкурси, мерките по предварителната подготовка на рецензентите за тяхната оценъчна дейност, връзката между отделните научно-експертни комисии с оглед прилагането на общи критерии за оценка на проекти и отчети на договори. Що се отнася до последното подобна спойка между отделните научно-експертни

комисии все още няма, а това подчертава съществуващото парцелиране на българската научна колегия в отделни области без еднакви и съобразени с международните стандарти критерии за научна дейност.

### **Заключение**

Вече двадесет години България търси своето място в европейското и световното научно пространство. Идеологическата рамка, сковаваща свободната научна мисъл и лъженаучните подходи към явления и събития вече са в миналото. Реформата в науката е осъзната необходимост. По мое убеждение най-важният резултат на реформата на науката в България е създаването на Националния фонд „Научни изследвания”. Даже тогава, когато проектното финансиране на научната дейност едва прохождаше, от дейността на Националния фонд „Научни изследвания” произтекоха три важни следствия:

1) Фондът даде възможност научните колективи сами да планират своята дейност, да се сдружават по целесъобразност, да определят според своите разбираня изследователските си задачи – това в условията на старото институционално финансиране на научната дейност с тромавата система на планиране на научната дейност с поръчки на апаратура и консумативи по първо и второ направление и силна зависимост от началстващите лица бе просто невъзможно. Когато редовите изследователи осъзнаха тази свобода, отпадна необходимостта в научните им публикации да се появяват имената на техните началници – фиктивни съавтори. Този процес не е за подценяване, защото продължителното прилагане на старата система роди не малка група „учени”, които хем формално са учени, хем фактически не са такива. Друг е въпросът в каква степен българската научна общност остана подвластна на старите рецидиви.

2) Когато парите, осигурявани от Фонда, бяха съвсем малко, даже тогава бързо се получи насищане на научните организации с информационна и комуникационна техника. Този който имаше договори, можеше да купи компютри, който нямаше договори – остана без тях. Това е особено важно, защото тази техника отвори прозорците към света, а отдавна се знае, че информацията и комуникацията са сърцето на науката.

3) Днес българската научна общност има достъп до световните научни бази данни – Web of Knowledge и Web of Science, SCOPUS, Science Direct, JSTOR, Springer, EBSCO. Тези абонаменти са изключително скъпи, ако трябва да ги правят отделните научни организации. Имаме ги благодарение на нашето Министерство и на нашия Фонд „Научни изследвания”.

Затова наш дълг е да съхраним Националния фонд „Научни изследвания” и да създадем условия за нормалното и пълноценното му функциониране. Лошите практики в нашата дейност хвърлят петно върху всички нас (Abbot, 2011).

#### БЕЛЕЖКИ

1. Поканен доклад на Форум “Проблеми на науката”. Форумът се организира от Съюза на учените в България. София, 14 април 2011, Централно управление на БАН.
2. *Просвета* **9**, 122-123 (1943-1944).
3. *Просвета* **9**, 120-121 (1943-1944)
4. *ДВ* бр. 63/1990.
5. *ДВ* бр. 92/2003.
6. *ДВ* бр. 83/2010.

## ЛИТЕРАТУРА

- Abbot, A. (2011). Bulgarian funding agency accused of poor practice. *Nature*, 472, 19.
- Shills, E. (1975). *Center and periphery: essay on macrosociology*. Chicago: Chicago University Press.
- Тошев, Б.В. (1999). Европейската наука и някои от проблемите на българската научна общност. *Стратегии на образователната и научната политика*, 7(2), 53-58.

## STATUS AND PROBLEMS OF THE BULGARIAN SCIENCE FUND (1990-2011)

**Abstract.** The article describes the establishment and development of the Bulgarian Science Fund (1990-2011). In this development three main periods could be recognized. In the first stage research projects in the basic scientific areas were financed in a modest way. The second stage was marked by the Act for research promotion in Bulgaria (2003). A criticism of that law is presented. In 2008 and 2009 the Fund had an increased budget but poor practices compromised the implementation of the announced competitive sessions. The reasons for failure are analyzed.

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# **A STUDY OF THE VOCATIONAL EDUCATION PREFERENCES AND INTERESTS OF THE INDIAN UNDERGRADUATE STUDENTS**

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**Abstract.** The study identifies the priorities of vocational educational courses and interests of the Indian undergraduate students. The study was conducted in S.V. University area covering 300 undergraduate students of Arts, Commerce and Science streams. The study identified the more prominent, prominent and less prominent vocational educational courses. Further, studies the association between vocational education interests and the background of the students (sex, caste, stream of study, year of study and area). The difference between various groups of students belonging to above groups in their vocational education interests of the undergraduate students was also identified. The study provided a suggestive list of vocational educational courses for undergraduate students for enhancing their employability.

**Keywords:** undergraduate students, career oriented courses, vocational education interests, institutional problems, employability

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## **Introduction**

The educational system produces the graduates and post graduates based on the theoretical curriculum without any practical training leading to the mis-match for the jobs in the market, resulting loss of manpower, unemployment, low economic productivity etc. This is largely due to the fact that the present education system provides basic education at various levels without focusing on any specialized skill. Hence, in order to improve the quality of manpower and to make use of the manpower readily in the employment market, there is a need to train the undergraduates and post- graduates in additional vocations along with the regular course according to their aptitude. Keeping in view of the globalization of education, the University Grants Commission has taken initiatives to make the current Indian higher education system more relevant and career oriented with focus on quality and excellence. It is envisaged that professionally qualified graduates with a sound knowledge of their core discipline and expertise in concerned skill will have more openings in service sector and self employment sectors. Demand and scope for such professionally trained graduates are visible in the applied fields of almost all basic/core disciplines and faculties in the current changing global scenario. Hence, to meet this challenge, the University Grants Commission has incorporated in its XI Five Plan Programme, the skill oriented and value added add on courses in colleges / universities to be opted by the students as a parallel sub-discipline while pursuing their degree level education.

Earlier, the University Grants Commission initiated a major programme of vocationalization at under graduation during VIII Five year Plan period (1994-95). The scheme was designed to ensure that graduates who pass out after completing these courses would have knowledge, skills and aptitude for gainful employment in the wage sector in general and self employment in particular. Since the inception of the scheme and until the end of the X Plan,

3,383 colleges and 43 universities have been provided assistance for introduction of vocational subjects.

### **Career oriented courses**

During X Plan, vocationalization programme at under graduate level was re-structured as the scheme of Career oriented programme and introduced a flexible system of advanced diploma programme which runs parallel to the conventional B.A./B.Com/B.Sc degrees and freedom was given to the colleges to formulate their own need based career oriented courses.

### **Objectives of the scheme**

The objective of the scheme is to introduce career and market-oriented, skill enhancing add-on courses that have utility for job, self-employment and empowerment of the students. At the end of three years, the students will be equipped with a Certificate/Diploma/Advanced diploma in an add-on orientation course along with a conventional degree in Science /Arts / Commerce.

The Institutions should offer a wide range of career-oriented subjects in various related areas. Some of the indicative courses for Science stream could be Information and Computer technology, Refrigeration, Biotechnology, Hospital Waste Disposal Management and Sericulture etc. For the Social Sciences and Humanities streams, the courses could be of inter-disciplinary nature viz. Applied Sociology, Applied Psychology, Tourism, Fashion Designing, Translation Proficiency, Television and Video Production. For the Commerce stream, courses could be in Insurance, Banking, e-Commerce World Trade, Foreign Exchange Trade, Retailing etc. The courses offered should be of inter-disciplinary nature. There should be no watertight compartments and students should have the freedom to diversify into various fields not necessarily related with their core discipline. For instance, a student



pursuing a bachelor's degree in a Science subject could side by side pursue a course in Event Management. Similarly a student with Arts background may have the option to pursue a course in Science Journalism.

No doubt, the University Grants Commission has started a new scheme to be implemented at the undergraduate level for training the students. However, the scheme has not specified in any vocational trade, but, left the choice to the concerned institutions to choose the vocational trades based on the aptitude of the students, local market and future employment potentialities in the subject concerned. In order to make the programme a success, there is a need to identify the vocational trade suitable to the undergraduates belonging to different subjects and the specific trades so as to help the institutions and the students to have a wide choice of trades to choose and get training without which, the scheme may not attain the objectives for which it has been designed.

The review of literature<sup>1-5)</sup> relating to the vocational education/training represented in the Survey of Research in Education Volume second, fourth, fifth and sixth brought out by the NCERT was collected and classified into four groups as vocational education, vocational training needs and interests of the different groups of the people, vocational education in formal educational institutions and the opinion of the various sections of the people towards vocational training programmes (*cf.* also Holland, 1973; Braginsky & Braginsky, 1974; Sodhi, 1988; Mohan & Gupta, 1990; Rao, 2003; Awasthi, 2006).

The studies conducted are general in nature and no attempt has been made to identify the priorities of the vocational education courses and the background factors influencing their vocational education interests. Hence, the present study is undertaken to identify the priorities of vocational education courses and factors contributing for vocational education interests.

### **Significance of the study**

The system of education in India was conceived to promote basic education at different levels. As a result of this, the products of this system in all disciplines are found to possess certain levels of knowledge in that area. The people coming out of such system are found to be not able to compete in the market to secure the employment. Realizing this deficiency, the University Grants Commission has launched the career-oriented courses at the undergraduate level as add on courses. The courses are being implemented throughout the country.

Freedom was given to the colleges to choose the courses based on the local conditions. The scheme is in operation for the last 10 years and it is understood that the courses organized could not fulfill the objectives of the scheme and the participation of the target was also found to be not satisfactory. Hence, the present study was conceived. The findings of the study will go a long way in upgrading the courses, to identify the priorities of the students and to suggest these courses to the colleges for their implementation. Further, the personal background factors associated with the vocational education interests of the students will also help the organizers to formulate programmes suitable to the target.

### **Objectives**

The specific objectives of the study are as follow: (1) to identify the vocational education courses preferred by the under graduate students; (2) to find out the vocational education interests of the undergraduate students; (3) to study the association between vocational education interests and personal characteristics of the students; (4) to study the differences if any in vocational education interests among the students belonging to different sex, caste, area, course and year of study.

## **Hypotheses**

The hypotheses of the present study are as follow: (1) the priorities of the vocational education courses are not similar among the students belonging to different groups; (2) there is no significant association between the vocational education interests and sex, caste, area, course of study and year of study of the undergraduate students; (3) there is no significant difference in the vocational education interests of the various groups of students belonging to viz., sex, caste, area, course of study and year of study.

## **Methodology**

### *Locale of the study*

The study is intended to identify the priorities of the under graduate students towards vocational education courses, association between vocational education interests and personal characteristics etc. The study was conducted among the students studying under-graduation in the affiliated colleges functioning in the purview of Sri Venkateswara University, Tirupati. Hence, the locale of the study is Sri Venkateswara University purview i.e., Chittoor, Kadapa and Nellore districts of Andhra Pradesh, India.

### *Sample of the study*

Sri Venkateswara University caters the needs of the Chittoor, Kadapa and Nellore districts. For the purpose of the present study, Chittoor district was selected for conducting the study. Out of the affiliated degree colleges functioning in the Chittoor district, 5 colleges were selected randomly. From each college, 20 students each from Arts, Commerce and Science were selected randomly as sample of the study. While choosing the sample, care was taken to choose the boys and girls equally. Hence, the sample was selected by using the stratified, purposive random sampling method. The total sample

comprised to 300 students i.e., 150 boys and 150 girls equally studying Arts, Commerce and Science streams.

### *Tools used for the study*

The aim of the study is to identify the priorities of vocational education courses and the interests possessed by the students in vocational education. In order to collect the data, there is a need to have a tool which can identify the priority as well as interests of the students in vocational education. The review of literature indicates that no effort has been made to identify such parameters relating to add on courses. Hence, the investigator has devised a tool. In this process, the investigator has collected the lists of add on courses organized by the different colleges supported by University Grants Commission. The lists of the courses were pooled and enlisted 86 items. In order to identify the priority for the course, as well as the intensity of the interest of the student towards the course, a 5 point rating scale was developed with a descriptive cues viz., strongly agree, agree, un-decided, disagree and strongly disagree. The tool thus prepared was given to a panel of 5 experts with a request to go through the items and suggest modifications if any. The experts agreed to the tool and not suggested any changes. The tool thus prepared was used to collect the data. The final tool thus prepared has two sections. Section – I intended to collect the background information of the sample and section II is intended to identify the priorities of the vocational education courses of the students and also to arrive at the vocational education interests of the students.

### *Data collection*

The tool intended to identify the priorities of add on courses and the intensity of the interests of the students towards the courses, thus prepared was administered to the selected sample. Before administering the tool, the investigators have explained the students about the objectives of the study and

procedure to be adopted by the students in filling the tool. The tool was canvassed to the students in groups and the data was collected.

### *Data analysis*

The data thus collected from the under graduate students of Sri Venkateswara University area was pooled together, fed to the computer and analyzed keeping in view of the objectives of the study. While analyzing the data, the priorities of the students belonging to different groups were prepared by classifying them as most preferred, preferred and less preferred courses based on their mean interest scores i.e., criteria of  $\text{mean} \pm \frac{1}{2} \text{SD}$  was used. Further, based on the intensity of the course interests checked by the students, their interests for vocational education was also analyzed according to their characteristics, to find out the difference of interests among different groups and to study the association if any between their characteristics of their vocational interests.

In order to achieve the above, the investigator has used the statistical techniques like mean and SD for prioritizing the interests, t/F test was used to find out the difference in mean interest scores and chi-test to study the association between the characteristics and their vocational interest courses.

### *Findings*

The findings of the study are presented in four sections viz. section – I deals with the profile of the sample students, section – II deals with the prioritization of vocational education courses of the students. The association between vocational education interests and selected characteristics of the students are presented in Section – III. The section – IV shows the influence of personal characteristics on the vocational education interests of the students.

## *Section – I*

### *Profile of the Student Sample*

The characteristics of the sample selected for the study clearly shows that the boys and girls, student belonging to streams of B.A., (arts), B.Com., (commerce), B.Sc. (science) and students from 1<sup>st</sup> year, 2<sup>nd</sup> year and 3<sup>rd</sup> year have been represented equally. However, in the case of caste, the population has been classified into three groups, viz., Other Castes (forward castes), Backward Castes (BC), Scheduled Castes (SC) and Scheduled Tribes (ST). The representation of the students belonging to backward caste is 46.67 percent followed by students belonging to other caste (43.33%) and representation of SC/ST students is only 10.00 percent. In the case of area, two thirds of the students are from rural areas and one third of them are from urban areas. The profile of the students studying in degree colleges clearly shows that the gender of the students has reached equality. In the case of discipline and year of study, the students' strength is similar. Mostly the rural students have represented the colleges. In the case of caste, the representation of the SC/ST students is less in comparison with their size of population and the representation of the backward castes is increasing.

**Table 1.** Characteristics of the sample students

S.No.	Variable	Group	Number	%
1	Sex	Men	150	50.00
		Women	150	50.00
2	Caste	OC	130	43.33
		BC	140	46.67
		SC /ST	30	10.00
3	Degree	B.A.	100	33.33
		B.Com.	100	33.33
		B.Sc.	100	33.33
4	Year of Study	I Year	100	33.33
		II Year	100	33.33
		III Year	100	33.33
5	Area	Rural	200	66.67
		Urban	100	33.33

## *Section - II*

### *Priorities of the undergraduate students towards the vocational education courses*

The tool designed to identify the preferences of the vocational education courses was administered to the sample students and the collected data was pooled, analyzed and tabulated. The data was tabulated based on the criterion of mean  $\pm \frac{1}{2}$  S.D. Based on the above criteria, the preferred vocational education courses were classified in to more prominent, prominent and less prominent and presented below.

Out of 86 courses presented for prioritizing, the undergraduate students have checked sixteen of them as more prominent courses. Majority of the courses preferred by the students as more prominent are related to Computer related courses such as Computer Applications, Copy editing & Web designing, Web Designing, Graphic Designing, Information Technology, Animation, Hardware Maintenance and PC Assembly, Desk Top Publishing and Printing Technology. The other areas preferred are soft skills, human rights, education for special children, Women studies, Office Management, Electrical Technician, Medical Lab Technician and Environmental studies. The trend of the preferences of the students is an indication that the students are aware about the areas where the employment opportunities are available. Hence, it is suggested that the colleges should go for the above courses so that these courses will be successful and the students enrolled in these courses will be gaining employable skills.

**Table 2.** More prominent vocational education courses preferred by the undergraduate students

S.No.	Item	Sample	Mean	Sd
1	Computer applications	300	4.23	1.14
2	Soft skills	300	3.97	1.28
3	Copy editing and web designing	300	3.88	1.23
4	Web designing	300	3.88	1.38
5	Graphic designing	300	3.85	1.42
6	Information technology	300	3.76	1.35
7	Animation	300	3.73	1.43
8	Human rights	300	3.64	1.38
9	Education for special children	300	3.63	1.42
10	Hardware maintenance and PC assembling	300	3.63	1.34
11	Women Studies	300	3.60	1.59
12	Office management	300	3.55	1.40
13	Electrical technician	300	3.52	1.48
14	Medical Lab technician	300	3.47	1.36
15	DTP and printing technology	300	3.45	1.36
16	Environmental studies	300	3.44	1.42

The trend of the preferences of the graduate students shows that out of 86 suggested courses, the sample has chosen 54 courses i.e. 62.78% of the courses as prominent add on courses. The courses are of heterogeneous in nature. However, all the courses show that they are of current in nature and will be able to generate employable skills among the students either for employment or for self-employment. The courses preferred as prominent courses by the students are presented in the Table 3.

The less prominent vocational education courses preferred by the undergraduate students show that the courses are mostly related to language acquisition and vocations that are restricted for few. Hence, the colleges need not be given prominence while submitting their proposals to the University Grants Commission in the areas listed under less prominent vocational education courses.



**Table 3.** Prominent add on courses preferred by the graduate students

S.No.	Item	Total	Mean	S.D.
1	Mathematical skills and everyday life problems	300	3.39	1.57
2	Talley accounting	300	3.38	1.50
3	Women and empowerment	300	3.38	1.56
4	Creative writing	300	3.37	1.45
5	Accounts and taxation	300	3.37	1.50
6	Historical tourism	300	3.36	1.45
7	Fruits and preservation	300	3.36	1.42
8	Tax management	300	3.36	1.52
9	Gandhi Giri - re-interpretation of Gandhi in modern context	300	3.33	1.49
10	Accounting and finance	300	3.32	1.56
11	Food technology and preservation	300	3.32	1.44
12	Marketing and salesman ship	300	3.29	1.53
13	Hospital Administration	300	3.26	1.38
14	Financial service banking	300	3.26	1.48
15	Intellectual property rights	300	3.22	1.45
16	Advertising	300	3.22	1.42
17	Physio therapy	300	3.21	1.51
18	Horticulture	300	3.21	1.40
19	Air travel, fares and ticketing	300	3.19	1.46
20	Bio-technology	300	3.19	1.51
21	e-commerce	300	3.19	1.53
22	Water shed management and soil conservation	300	3.19	1.47
23	Entrepreneurship for women	300	3.18	1.51
24	Labour laws	300	3.16	1.49
25	Textile designing	300	3.16	1.50
26	Cutting, tailoring, embroidery, dress designing and drafting	300	3.15	1.58
27	Multi-purpose health worker	300	3.14	1.41
28	Food adulteration and control	300	3.14	1.42
29	Operational research	300	3.11	1.43
30	Event management	300	3.10	1.45
31	Linux operating system	300	3.10	1.44
32	Bio-informatics	300	3.06	1.43
33	Counselling and psycho therapy	300	3.06	1.41
34	Psychological counselling	300	3.05	1.45
35	Psychological assessment	300	3.00	1.39
36	Dental Technician	300	2.96	1.39
37	Rural engineering technician	300	2.96	1.43

38	Survey research	300	2.95	1.43
39	Risk management and insurance	300	2.93	1.45
40	Common Professional Tax	300	2.92	1.47
41	Disaster Management	300	2.92	1.44
42	Value Added Tax	300	2.90	1.54
43	Forensic science	300	2.87	1.48
44	Forensic sciences	300	2.85	1.36
45	Gender analysis and integration	300	2.82	1.41
46	Bio-fertilizer technology	300	2.79	1.44
47	Seri-culture	300	2.78	1.46
48	Catering and restaurant management	300	2.78	1.48
49	Dairying	300	2.77	1.44
50	Clinical diagnostic techniques	300	2.77	1.38
51	Remote sensing	300	2.76	1.43
52	Secretarial practice	300	2.76	1.46
53	Tax Deducted at Source	300	2.75	1.55
54	Cosmetology	300	2.75	1.49

**Table 4.** Less prominent vocational education courses preferred by the undergraduate students

S.No.	Item	Total	Mean	SD
1	Professional ethics	300	2.72	1.37
2	Fisheries	300	2.71	1.40
3	Retailing and trade	300	2.67	1.40
4	Bee-culture	300	2.66	1.38
5	Peace and conflict resolution	300	2.64	1.35
6	Refrigeration	300	2.64	1.34
7	Aviation	300	2.60	1.36
8	Aviation, hospitality and catering	300	2.57	1.34
9	Plumbing	300	2.41	1.26
10	Chinese	300	2.37	1.34
11	Russian	300	2.32	1.35
12	Spanish	300	2.32	1.44
13	French	300	2.31	1.34
14	German	300	2.18	1.27
15	Japanese	300	2.13	1.29
16	Korean	300	1.88	1.16

The prioritization of the preferences of the vocational education courses by the undergraduate students shows that out of 86 courses 16 courses

have been preferred as more prominent and 54 courses as prominent courses and 16 were found to be less prominent. In view of this, it is suggested that the colleges willing to organize vocational education courses should choose the courses from the more prominent and prominent list. The courses suggested will be attractive for the students and also they will be able to generate employable skills among the students.

### *Section – III*

#### *Association between vocational education interests and selected characteristics of the students*

In order to identify the association between vocational education interests and selected characteristics of the students, the students were classified into different groups based on their characteristics viz., sex, caste, area, discipline and year of study. Based on their respective mean interest scores, they were classified into three groups, i.e., low, moderate and high interest groups. Chi-test was applied to study the association. The findings are presented below.

#### *Sex vs. vocational education interests*

The sample students were categorized into two groups, viz., men and women and based on their mean interest scores, they were again classified into low, medium and high vocational interest groups. As per this classification, among the men, majority of them possessed medium interest and where as in the case of women, they have more interest in vocational courses. However, the calculated chi-test value 2.94 shows that there is no association between sex and vocational education interests. Hence, the hypothesis framed is accepted.

**Table 5.** Association between personal characteristics and vocational education interests

S. No	Variable	Group	Low	Medium	High	Chi-value
1	Gender	Men	46 (54.76)	58 (52.73)	46 (43.40)	2.94@
		Women	38 (45.24)	52 (47.27)	60 (56.60)	
2	Caste	OC	30 (35.71)	43 (42.73)	57 (50.00)	5.39@
		BC	46 (54.76)	49 (44.55)	45 (42.45)	
		SC/ST	8 (9.52)	14 (12.73)	8 (7.55)	
3	Area	Rural	62 (73.81)	75 (68.18)	63 (59.43)	4.54@
		Urban	22 (26.19)	35 (31.82)	43 (40.57)	
4	Course	BA	34 (40.48)	38 (34.55)	28 (26.42)	9.52*
		B. Com	18 (21.43)	38 (34.55)	44 (41.51)	
		B.Sc	32 (38.10)	34 (30.91)	34 (32.08)	
5	Year of study	First year	31 (36.90)	43 (39.09)	26 (24.53)	10.09*
		Second year	33 (39.29)	31 (28.18)	36 (33.96)	
		Third year	20 (23.81)	36 (32.73)	44 (41.51)	

#### *Caste vs. vocational interests*

As per the caste, the students were classified into Other Castes, Backward Castes, Scheduled Castes & Scheduled Tribes. Among them, again they were classified into the students belonging to more vocational education interests, medium and low vocational education interest groups. In the case of Backward Castes, more or less the students have been distributed equally in all the groups. However, medium vocational interest groups are more in number among Backward Castes and Scheduled Castes & Scheduled Tribes groups. The calculated chi-values show that there is no significant association between caste and vocational education interests. Hence, the hypothesis is accepted.

#### *Area vs. vocational education interests*

As per the area, the students were classified into two groups i.e., rural and urban and their respective interests in vocational education were calculated. As per the distribution, majority of the rural students possessed medium

interest in vocational education. In the case of urban students, majority of them possessed more interest. Among the students with more interest in vocational education, the rural students occupied the first position. The calculated chi-value shows that the area does not have influence on the vocational education interests of the students. Hence, the hypothesis is accepted.

#### *Discipline vs. vocational education interests*

Based on the discipline and interest for vocational education possessed by them, they were classified into three groups and F-test was applied. The classified information presented in the Table shows that the majority of students are from Arts stream possessed medium interests, commerce students with high interests and science students have been represented equally in medium and high groups. In the case of students with high interest groups, B.Com students have more vocational education interests. In the case of medium interests, BA and B.Com students represented equally. In the case of low interest groups, BA group have represented with more number of students. The calculated Chi-value shows that there is a significant association between discipline and vocational education interests among the students. Hence, the hypothesis is not accepted.

#### *Year of study vs. vocational education interests*

Based on the year of study and the vocational education interests possessed by the students show that majority of the students possessed medium interests followed by low and high interests. Among the first year students, they possessed medium interests, high interests among majority of students of second and final year students. The calculated chi-test score is significant at 0.05 levels indicating that there is an association between year of study and vocational education interests is significant. Hence, the hypothesis is not accepted.

#### *Section - IV*

##### *Relationship between selected characteristics and the vocational education interests*

In order to find out the difference in mean interests among different groups of students, the sample were classified into different groups based on their background characteristics, and their respective mean vocational education interest scores were calculated and t/F test was applied. The findings of the analysis are presented in the following table.

**Table 6.** Relationship between selected characteristics and the vocational education interests

S. No	Variable	Group	N	Mean	SD	t/F-value
1	Gender	Men	150	261.45	55.47	1.21 @
		Women	150	269.39	58.35	
2	Caste	OC	130	272.09	53.68	1.65 @
		BC	140	259.53	60.81	
		SC/ST	30	264.03	49.69	
3	Area	Rural	200	258.61	59.89	3.19**
		Urban	100	279.06	48.14	
4	Course	BA	100	251.91	64.51	5.47**
		B. Com	100	278.24	55.39	
		B.Sc	100	266.12	46.83	
5	Year of study	First year	100	258.73	58.54	4.46**
		Second year	100	258.34	60.66	
		Third year	100	279.20	48.78	

The findings presented in the above table with regard to the mean vocational education interest scores possessed by the male and female students show that female students have more mean vocational education interests than the male students. It shows that the girl students are more interested to learn vocational courses. However, the difference in mean interest scores is not significant. It indicates that there is no significant difference between male and female students in their vocational education interests. Hence,

the hypothesis “There is no significant difference between male and female students in their vocational education interests” is accepted.

The mean vocational education interest scores obtained by the students belonging to the different caste groups show that the students from OC groups possessed more mean interest scores followed by SC/ST students. The students from BC group possessed comparatively low interest in vocational education. This shows that the students from OC group are more prone for vocational education. The calculated F-value is lesser than the Table value indicating that there is no significant difference in the mean interest scores obtained by the three caste groups. Hence, the formulated hypothesis is accepted.

The vocational education interests of the students belonging to rural and urban areas shows that the students from urban areas have more inclination for vocational education than the students from rural areas. The calculated F-value also supports the above. Hence, the hypothesis that there exists no significant difference in mean vocational education interests among the students belonging to urban and rural areas is not accepted.

The mean vocational education interest scores possessed by the students of Arts, commerce and science streams shows that the students from B.Com group have obtained more interest scores followed by science and arts students. It is true that the students from commerce will have positive attitude and interest towards vocational education than the other streams. The calculated F-value also supports that the difference is significant among three streams of students. Hence, the hypothesis that there exists no significant difference in the mean vocational education interests among the students belonging to arts, commerce and science streams is not accepted.

The year of study and vocational education interests possessed by the students show that the final year students possess more vocational education interest scores. The first and second year students possess similar interests. The calculated F-value is higher than the table value indicating that it is sig-

nificant. In view of this, the hypothesis that there exists no significant difference in the mean vocational education interest scores possessed by the students belonging to first, second and third year of study is not accepted.

The findings clearly indicate that the students belonging to female, OC, urban, commerce and third year possessed more mean vocational education interests than the other groups. Hence, while formulating the vocational education courses, the above groups may be kept in view.

### **Conclusions**

The vocational courses introduced as add on courses at the graduation level for developing the employable skills among the students and to equip them for self employment will be successful only if the courses were organized based on the employment market and the aptitude of the students. The study identified that the scheme of career oriented courses will be successful only if the courses belonging to Computer Related Courses, Human Rights, Education for Special Children, Women Studies, Office Management, Electrical Technician, Medical Lab Technician, Environmental Studies etc., Further, it also disclosed that the students studying stream of education, year of education are closely associated with the vocational interests. The vocational interests possessed by the students show that the students belonging to female, OC, urban, commerce and third year possessed more mean vocational education interests than the other groups. While conceiving and organizing the vocational education courses, the above may be kept in view to make them success and to serve the objective of the scheme.

### **NOTES**

1. Second Survey of Research in Education (1972-1978). 1990, p. 543. NCERT, New Delhi.



2. Fourth Survey of Research in Education (1983-1988). Volume II, 1991, p. 1291, p. 1292, p.1296, p. 1298, p.1301, p. 1304, p. 1306, p. 1307, p. 1311, p. 1513, p.1519. NCERT, New Delhi.
3. Fifth Survey of Research in Education (1988-1992). Volume II, 2000, p. 1510, p. 1513, p. 1515, p. 1519, p. 1528, p. 1531, p. 1534, p.1535, p. 1541, p. 1542. NCERT, New Delhi.
4. Sixth Survey of Research in Education (1993-2000). Volume I, 2006, p. 141, p.149. NCERT, New Delhi.
5. <http://unesdoc.unesco.org/images/0008/000845/084598eo.pdf>

## REFERENCES

- Awasthi, I.C. (2006). Education and employment market: a case study of Krishna district. *J. Adult Education & Extension*, 2(2), 47-80.
- Braginsky, B. & Braginsky, D. (1974). *Mainstream of vocational psychology*. New York: Holt, Rinehart & Winston.
- Holland, J. (1973). *Making vocational choice: a theory of careers*. Englewood Cliffs: Prentice Hall.
- Mohan, S. & Gupta, N. (1990). Factors related to choice of vocational courses. *Indian Educational Review*, 25(3), 14-24.
- Rao, V.K. (2003). *Vocational Education*. New Delhi: APH.
- Sodhi, T.S. (1988). Vocational interests and occupational choices of adolescent girls of Chandigarh. *Indian Educational Review*, 23(4), 110-120.

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● *Academic Archives* ●

*Новият Закон за развитието на академичния състав в Република България (2010) отмени научните звания и въведе процедури за заемане на академичните длъжности в научните организации. Научно жури от 7 специалисти с 3 рецензии и 4 становища взема решение за заемане на академичната длъжност „професор”. Публикуването на рецензиите осигурява тяхната по-широка публичност и повишава отговорността на техните автори. За постигане на тези цели нашето списание въвежда рубриката “Academic Archives.”*

**КОНКУРС ЗА ЗАЕМАНЕ НА  
АКАДЕМИЧНА ДЛЪЖНОСТ  
„ПРОФЕСОР ПО ТЕОРЕТИЧНА ХИМИЯ”  
В КАТЕДРАТА ПО ФИЗИКОХИМИЯ НА  
СОФИЙСКИЯ УНИВЕРСИТЕТ  
„СВ. КЛИМЕНТ ОХРИДСКИ”  
С КАНДИДАТ ДОЦ. Д-Р АЛЯ ВИТАЛИ  
ТАДЖЕР<sup>1)</sup>**

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**Резюме.** Доц. д-р Аля Витали Таджер е кандидат в конкурс за заемане на академична длъжност „професор по теоретична химия” в Катедрата по физикохимия на Софийския университет „Св. Климент Охридски”. Рецензията на проф. д-хн Борислав Тошев анализира

учебната дейност и научните постижения на доц. Таджер и достига до заключението, че заемането на тази конкурсна длъжност от доц. Таджер е целесъобразно.

*Keywords:* theoretical chemistry, quantum chemistry, computational chemistry, dyes, polyaniline, monolayers, Tadjer

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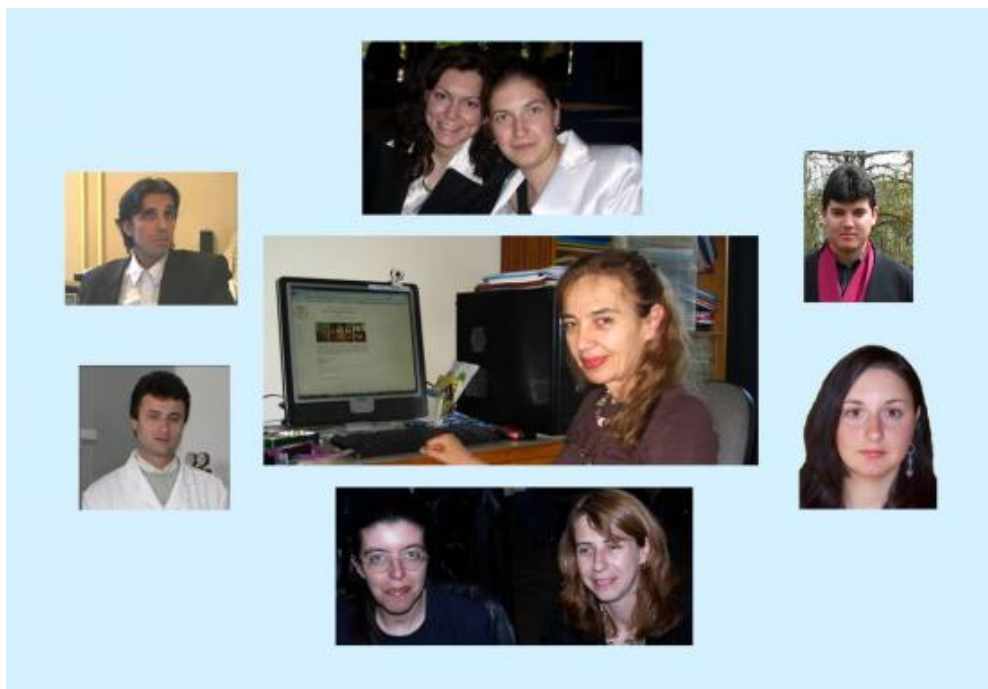
Тази рецензия дава отговор на два въпроса: 1. дали в Катедрата по физикохимия на Софийския университет “Св. Климент Охридски” е целесъобразно и необходимо да има професор по теоретична химия и 2. дали единственият кандидат в този конкурс, доц. д-р Аля Витали Таджер, е достойна да заеме тази академична длъжност.

1. Катедрата по физикохимия е основана в края на 1927 г. под името Катедра по теоретична химия. Титуляр на Катедрата е световно известният български и германски учен проф. д-р Иван Странски. Въпреки че основната тематика на Катедрата в годините на нейното съществуване е теорията на образуване на нови фази в преситени системи с всичките ѝ възможни приложения, значението на квантовата химия и нейните изчислителни техники на атомно и молекулно ниво винаги са разглеждани като съществена част от физикохимичния инструментариум. Затова встъпителната лекция на Иван Странски (1925/1926) е “Теоретичната химия, нейното развитие и нейната цел”, а по-късно се появява и “Квантовата химия и нейното значение за химията” (Странски, 1926). Квантовата химия заема централно място и в учебника по физикохимия от 1952 г. (Каишев & Христов, 1952). Това е основата, върху която се развиват съвременните изследвания по квантова и изчислителна химия в Катедрата по физикохимия, в която от доста време работи един от пионерите на българската квантова химия – проф. д-р Николай Тютюлков. Очевидно проф. Тютюлков намира

физикохимичната среда за стимулираща, доказателство за което е току що публикуваната му нова книга (Тютюлков & Дитц, 2011). В Катедрата по физикохимия успешно се развива Учебно-научна лаборатория по квантова и изчислителна химия, която организира авторитетен международен Клуб-семинар *In Silico* под ръководството на ръководителя на Лабораторията доц. Аля Таджер. При такива обстоятелства изглежда очевидно, че една професура по теоретична химия в Катедрата по физикохимия ще гарантира за дълго време възходящото развитие на въпросната научна проблематика заедно с нейните образователни проекции.

2. Единствен кандидат в конкурса за професор по теоретична химия е г-жа доц. (от 2000 г.), д-р (от 1982 г.) Аля Витали Таджер (р. 1950 г. в София), ръководител на посочената по-горе Лаборатория в Катедрата по физикохимия. Аля Таджер е провела успешни специализации в САЩ, Германия, Обединеното кралство, Австралия и Франция. Тя е титуляр на курсовете по строеж на веществото, теоретична химия, квантова химия и химична връзка и др. за образователно-квалификационната степен “бакалавър”, чете курсове и на магистърско ниво, където е в ръководството на университетската магистърска програма по изчислителна химия. Несъмнено конкурсът за професор по теоретична химия е обезпечен с голям излишък аудиторна учебна заетост. Способността за ефективна работа в екип и рядкото качество лидерство (leadership) характеризат най-добре личността Таджер. Тези качества се манифестират с това, че нейните старши сътрудници доц. д-р Анела Иванова и гл.ас. д-р Галя Маджарова се развиват особено успешно на научното поприще, а лабораторията, ръководена от доц. Таджер, е желано място за много ентусиазирани студенти, защото там те получават знанията, уменията и грижата на старшия персонал за бъдещата им успешна научна кариера. Затова е

логично, че в кариерата си доц. Таджер е подготвила 31 дипломанти и 9 докторанти, повечето от които имат вече собствени научни постижения, за което някои от тях са получили признание и в чужбина. Успехите на д-р Таджер в подготовката на специалисти с най-висока квалификация получи тази година и национално признание – за тази дейност тя получи престижната в България награда „Питагор”. Имам много свидетелства, които потвърждават международната разпознаваемост на доц. Таджер на полето на науката. Между тях е членството на доц. Таджер в редакционните колегии на *International Journal of Quantum Chemistry* (от 2002 г.) и на американското списание *ARKIVOS* (от 2007 г.). Редовно доц. Таджер е търсена за рецензент в системата на рецензирване на няколко престижни научни списания. В качеството ми на ресорен министър за висшето образование в Министерството на образованието и науката имах възможност да проследя проведената през 2001 г. в резиденцията “Бояна” Европейска конференция по квантовите системи в химията и физиката, в организацията на която доц. Таджер имаше ключовата роля. Там бях респектиран от явно видимата нейна международна репутация. Участието на доц. Таджер и нейните сътрудници в научния живот в нейната област е забележително, което се вижда от приложения в документацията по конкурса списък. Длъжен съм да отбележа и активното участие на доц. Таджер в проектното финансиране на научната дейност. В качеството ми на председател на научно-експертни комисии към Националния фонд “Научни изследвания” познавам в подробности представените от Таджер проекти и отчетите към тях – яснота на идеите и съжденията, прецизност в използването на теоретичния инструментариум, актуалност на обсъжданите научни проблеми – това в съвкупност характеризира тези научни документи.



Доц. д-р Аля Таджер (в средата) със сътрудници (отдолу по часовниковата стрелка): д-р Галя Маджарова, доц. д-р Анела Иванова, д-р Цветанов, д-р Фратев, Петрова и Велинова, д-р Дребов, д-р Романова

От 2001 г., след получаването на научното звание „доцент” през 2000 г., д-р Таджер е публикувала 41 научни труда, всички в съавторство. Последната работа на автора под № 71 в списъка на публикациите, отбелязана като „изпратена”, вече е публикувана (Petrova et al., 2011). В SCOPUS има 55 документа, принадлежащи на д-р Таджер, най-ранният от които е от 1975 г. и е № 1 от списъка на кандидата. SCOPUS съобщава за 80 съавтори в тези научни статии, в които цитираните източници са 1375 и тези статии са получили 228 цитата (в документацията по конкурса е представен подробен списък на 347 забелязани цитати, от които 192 са цитати на монографията “Polymethine Dyes” (Tyutyulkov et al., 1991). Списъкът на цитатите сигурно не е пълен, защото, разглеждайки го внимателно, аз не намирам някои от известните на мен цитирания на трудовете на д-р Таджер (впрочем последният

известен на мен цитат (Lu et al., 2011) е от 22 април). Обектите на изследване в тези публикации са много разнообразни – от молекули и йони до супермолекули от типа на полимерите и молекулните агрегати с различна размерност, формирани от близко- и далечно-действащи сили. Методите и техниките на квантовата и изчислителната химия са прилагани към голямо разнообразие на химични субекти – полиени, полиметини, полиацени, полианилини, антиароматни молекули и хетероциклени съединения, антиоксиданти, антитуморни агенти, метал-органични комплекси, неразтворими монослоеве и мицели. Претенцията на автора за научен принос в нейните публикации е представена в обширна и ясно написана справка. Аз изцяло приемам тази справка на кандидата, но намирам, че тя е написана излишно подробно. Ясно е, че тя отразява осъзнатата от автора необходимост да се направи рекапитулация на получените научни резултати, вън от хронологичното им проследяване, да се погледне „отгоре” на реализираната научна дейност. Затова ще препоръчам на д-р Таджер да подготви без отлагане дисертационен труд за научната степен „доктор на химическите науки”, който е най-добрата форма за маркиране и запазване за автора на част от научното поле, в което той работи.

Ще се въздържа да давам оценки по специфични проблеми от творчеството на кандидата в области, в които аз самият нямам собствени научни публикации. Това със сигурност ще направят другите рецензенти по този конкурс. Има, обаче, тематики, по които такова категорично мнение мога да дам – самоорганизацията в дисперсните системи в междупазовите повърхности (неразтворимите монослоеве) и в обема на фазите – образуването на мицели. Много от получените резултати са с приносен характер, например в случая на повърхностноактивни молекули в присъствие на малко вода структурирането на водните молекули в монослоя е такова, че да се осигури образуването на най-



голям брой водородни връзки, както между самите водни молекули, така и с молекулите на сурфактанта; определен е броят на молекулите на разтворителя, над който се достига насищане на стойността на нормалната компонента на диполния момент като е изяснена ролята на латералните взаимодействия с молекулите на повърхностноактивното вещество; освен случаите с плътна опаковка на молекулите на едно повърхностноактивно вещество в слоя е разгледан и случаят на моделни слоеве от два различни липида, при това в целия диапазон от повърхностни концентрации заедно с реорганизацията на молекулите при компресия на слоя. Така е определена еднозначно ролята на водата в повърхностния слой за електричните характеристики на слоя, с което се опровергава приетото до сега схващане за водата като пасивен спрямо енергетиката на слоя субстрат. Във всички изследвания симулациите са с Монте Карло или молекулна динамика техники. Известно е, че липидните слоеве са модели на клетъчни мембрани – тогава проникването на лекарства в клетката през клетъчната мембрана може да стане чрез капсуловането им в биосъвместими наноконтейнери, а модел на такъв носител са мицели от олигоетиленгликолови етери на висши мастни киселини. Молекулните симулации в такива системи предполагат преодоляването на редица проблеми в използваните изчислителни методи, което авторите на тези статии са постигнали и затова медицинските проекции на изследванията на д-р Таджер несъмнено ангажират обществено внимание, което е документирано в научната литература.

Ще завърша тази рецензия още с два акцента. В наукометрията е введен показателят response time [време на отзвук],  $\tau_1$  – това е времето, след което една публикация получава своя първи цитат. Очевидно стойността на този параметър маркира моментът, когато една статия променя своя статут – от *незабелязана и неизползвана* към *използвана и*

оценена. Има две статии на д-р Таджер, които са с  $\tau_1 \leq 1$  [год] – Velkov et al. (2007) и Velkov et al. (2009). Очевидно това е добър атестат за научното творчество на кандидата. Впрочем втората статия е квантово-химично и биохимично изследване на антиоксидантната активност на мелатонина. Нов индикатор за актуалността на научните изследвания на даден изследовател е въведеният през 2005 г. *h*-индекс на Хирш. Голямата стойност на *h*-индекса на даден учен означава, че неговите изследвания в неголям съвременен период (например последните 5-10 години) ангажират голямо обществено влияние, и следователно, такава проблематика, носи белезите на актуалността в дадения момент. За това този индекс е въведен главно за целите на проектното финансиране. По данни на SCOPUS д-р Таджер има *h*-индекс=8, което, несъмнено, е добър атестат за нея.

Отговорите на двата въпроса, поставени в началото на настоящата рецензия, са категорично положителни – 1. Катедрата по физикохимия на Софийския университет „Св. Климент Охридски” има нужда от академична длъжност „професор по теоретична химия”, което ще осигури продължаване на възходящото ѝ развитие и 2. достойният кандидат за заемане на тази академична позиция е доц. д-р Аля Витали Таджер. Моята препоръка към почитаемото научно жури в своя анализ на постъпилата конкурсна документация да достигне до същото заключение.

Ст. София, Разпети петък, 22 Април 2011 г.

#### БЕЛЕЖКИ

1. Журнален вариант. В конкурса са представени още две рецензии с положително заключение – на проф. дхн Петко Иванов от Института по органична химия с Център по фитохимия и на ст.н.д. д-р Цонка Минева, Montpellier, Франция.

## ЛИТЕРАТУРА

- Lu, H., Shimizu, S., MacK, J., Shen, Z. & Kobayashi, N. (2011). Synthesis and spectroscopic properties of fused-ring-expanded azaboradiazaindecenes. *Chemistry – An Asian J.*, 6, 2026-1031.
- Petrova, J.B., Romanova, J.R., Madjarova, G.K., Ivanova, A.N. & Tadjer, A.V. (2011). Fully doped oligomers of emeraldine salt: polaronic versus bipolaronic configuration. *J. Phys. Chem. B*, 115, 3765-3776.
- Tyutyulkov, N., Fabian, J., Mehlhorn, A., Dietz, F. & Tadjer, A. (1991). *Polymethine dyes: structure and properties*. Sofia: Sofia University Press.
- Velkov, A, Velkov, Z., Galunska, B.T., Paskalev, D.N. & Tadjer, A.V. (2009). Melatonin: quantum-chemical and biochemical investigation of antioxidant activity. *Eur. J. Medicinal Chem.*, 44, 2834-2839.
- Velkov, Z.A., Kolev, M.K. & Tadjer, A.V. (2007). Modeling and statistical analysis of DPPH scavenging activity of phenolics. *Coll. Czech. Chem. Commn.*, 72, 1461-1471.
- Каишев, Р. & Христов, С.Г. (1952). *Физикохимия. Първа част*. София: Наука и изкуство.
- Странски, И. (1925/1926). Теоретичната химия, нейното развитие и нейната цел. Встъпителна лекция. *Год. Соф. Унив. Физ.-мат. Фак.*, 22(2), 97-111.
- Странски, И. (1926). Квантовата химия и нейното значение за химията. *Химия и индустрия*, 5, 161-172.
- Тютюлков, Н. & Дитц, Ф. (2011). *Симетрия. Строеж и свойства на молекулите*. София: Изкуства.

**ACADEMIC POSITION “PROFESSOR IN  
THEORETICAL CHEMISTRY” AT THE  
DEPARTMENT OF PHYSICAL CHEMISTRY,  
UNIVERSITY OF SOFIA: DOC. DR. ALYA  
TADJER**

**Abstract.** This is a review of the teaching and research activity of Dr. Alya Vitali Tadjer who applies for the academic position “Professor in Theoretical Chemistry” at the Department of Physical Chemistry, University of Sofia.

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• *Reviews* •

## **ВИСШЕТО ОБРАЗОВАНИЕ В КОМУНИСТИЧЕСКА БЪЛГАРИЯ**

**Б. В. ТОШЕВ**

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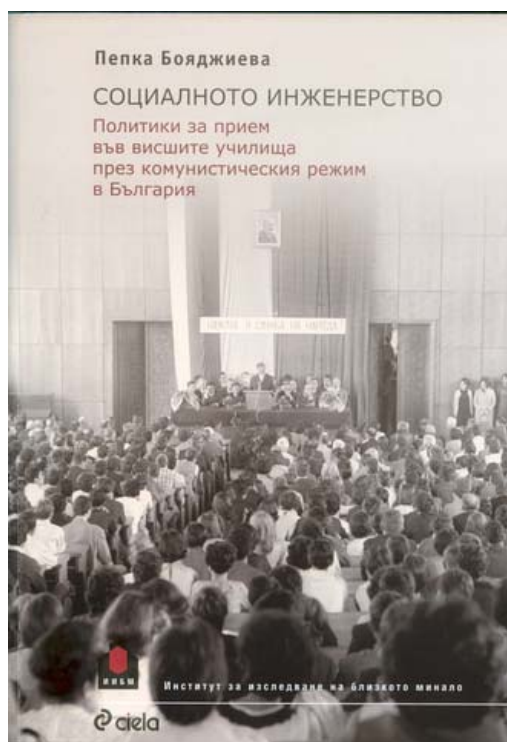
П. Бояджиева. *Социалното инженерство. Политики на прием във висшите училища през комунистическия режим в България*. София: Сиела, 2010, 391 с. ISBN 978-954-0714-5

Училището формира обществото – цел на образованието е социализацията на младите поколения, което означава, че младежта трябва да приеме и да спазва правилата, по които живее обществото (Burns, 2002). В допълнение към това висшето образование подготвя специалистите, които трябва да поемат ръководството и управлението на целия стопански и обществен сектор, които трябва да се развиват така, както съответната държава смята за уместно. По тези причини изследванията върху образователните системи на тоталитарните държави са от особен интерес.

Не е излишно да се напомни, че тоталитарни са тези режими, при които има тоталитарна сила, която поставя под контрол всички сектори на обществения живот в името на някаква, обикновено шумно рекламирана цел. По необходимост този контрол толерира едни и преследва други обществени слоеве в съответната страна и затова тези

режими днес се преценяват като престъпни.<sup>1)</sup> Фашистският режим в Италия, национал-социалистическият режим в Германия и комунистическият режим в Съветския съюз и неговите сателити са тоталитарните режими на XX-ия век.

Установяването на комунистическия режим в България и реформирането на българската образователна система по нов образец минава през един кратък предварителен етап (1944-1948), описан по блестящ начин в книгата на покойната Весела Чичовска (1995) „Политиката срещу просветната традиция”. Това е периодът на постепенното въвеждане на съветския образователно-научен модел. Във висшето образование това е моделът на тесните специализации и квалификации, в който е заложено екстензивното развитие на системата на висшето образование, което води до нейното диспергиране на все по-малки части и в крайна сметка до загуба на устойчивост и неефективно и скъпо обучение (Димитров & Тошев, 2001).



Книгата, която е обект на настоящата рецензия, е особено ценна, защото анализира случвалото се в българското висше образование практически през целия комунистически период на България. Книгата е част от една поредица книги, издавани от формирания през 2005 г. Институт за изследвания на българското минало. Авторът, проф. дсн Пепка Бояджиева, е доказан специалист в областта на образователната политика и управление. Между нейните по-ранни публикации върху университетската тема отбелязване заслужава книгата „Университет и общество” (1998). Проф. Бояджиева е социолог. Затова акцентът в тази книга е поставен върху социалното инженерство, чрез което се формира студентската маса на основата на политиката за приемане на студенти във висшите училища на България. Всички детайли на тази политика, претърпяла през годините някои модификации, отчитащи моментните нужди или моментните разбирания на режима, са описани в книгата с най-големи подробности.

Книгата на Пепка Бояджиева е структурирана в седем глави: 1. Ценности и политики в съвременното висше образование; 2. Институционализация на социалистическата система за прием във висшите училища; 3. Социалното инженерство – форми на дискриминация; 4. Социалното инженерство – привилегии; 5. Ерозията на социалистическата система за прием във висшите училища; 6. Резултатът от социалното инженерство; 7. (Не)уникалността на българския случай. Заедно с приложенията си книгата представя една ярка и пълна картина на състоянието на българското висше образование в периода 1948 - 1990 г. и представлява увлекателно и поучително четиво, както за участниците в „социалистическото развитие на България”, така и за младите поколения на България, които днес нямат никаква представа за този исторически период. Последната бележка не е

за учудване, защото винаги в хаоса на големите социални катаклизми историческата памет линеи, губи се или се изкривява.

Нека да кажем ясно – политиката на прием на студенти в българските висши училища в този дълъг исторически период отразява ключовия за комунистическата идеология класово-партиен подход, според който поощрения заслужават тези, които се преценяват за полезни за развитието на социализма, а онези, за които има подозрения, че би могло да бъдат нелоялни спрямо режима, подлежат на ограничения и преследване. Така правото на привилегии имат представителите на работническата класа, трудовото селячество и народната интелигенция. А бившите експлоататорски обществени прослойки – буржоазните издънки, крепителите на стария монархо-фашистки режим и техните наследници, децата на кулаците, морално-деградирали елементи следва да бъдат ограничавани и превъзпитавани, поради вината им – тяхна и на родителите им, спрямо трудовия народ. Привилегиите имат и друга страна – тъй като още от ранния комунизъм е известно, че “кадрите решават всичко”, възможно е преференциално да се приемат студенти в специалности, от които се очаква активно участие в стопанското развитие на определени икономически сектори (например химия, металургия, рудодобив, полупроводници, кооперативно земеделие) или райони на страната, съобразно решенията на многобройните пленуми, конференции и конгреси на комунистическата партия – ръководител и вдъхновител на всички наши успехи и победи.

Книгата на Пепка Бояджиева предлага панорамна картина на всичко това. Списъкът на нормативните актове, които формират тази политика, архивните документи, устните истории на потърпевши от тази политика, придават особена ценност на събрания и професионално коментиран материал.



Научната ценност на рецензираната книга не е просто в описаната и хронологично подредена фактология. Нейната ценност се определя от сполучливото и балансирано съчетаване на основните методи на качествения анализ в обществознанието – етнографските (ethnography) и историографските (historiography) методи се преплетени с подходящи проучвания на частни случаи (case studies) и устни истории (oral histories), с което този класически инструментариум получава своето ярко проявление. Единствената грешка от етичен характер може би е посочването на имената на обикновени хора в архивни документи, които съдържат субективни, груби и навярно неверни квалификации, които уронват техния обществен престиж (навярно тези хора и сигурно техните наследници са все още между нас).

Очевидно двете основни монографии (Чичовска, 1995; Бояджиева, 2010) са добра основа за следващи проучвания в областта на университетската политика и управление. Има поне две явления в световното висше образование, които все още чакат своят задълбочен анализ: масовизацията на висшето образование (*ср.*, Trow, 1973) и макдоналдизацията на висшето образование (*ср.*, Тошев, 2002). На стр. 15 в „Социалното инженерство” проф. Бояджиева се пита „дали и доколко масовизирането на висшето образование е равнозначно на неговото демократизиране”. Моят отговор на този въпрос е отрицателен – вместо демократизиране „фазите” на студентите и преподавателите, монолитни преди, сега се диспергират на фаза на студентите и фаза на преподавателите и фаза на маргиналните студенти и фаза на маргиналните преподаватели и в интерфейса между фазата на маргиналните студенти и маргиналните преподаватели избуява уродливото явление на корупцията във висшето образование.<sup>2)</sup> Има и втори особено вреден ефект – с масовизацията на висшето образование се увеличава полето на сурогатната наука за сметка на полето на

истинската наука.<sup>3)</sup> Аз очаквам приносът на проф. Бояджиева в бъдещия анализ на тези особено сложни въпроси да бъде съществен. А описателната част на промените във висшето образование в България след 1989 г. вече е дадена (Георгиева, 2001).

#### БЕЛЕЖКИ

1. Закон за обявяване на комунистическия режим в България за престъпен. *ДВ*, бр. 37/2000.
2. Тошев, Б.В. (2008). Корупцията се ражда от липсата на академизъм. *Дневник*, 25 септември.
3. <http://tech.groups.yahoo.com/group/bulgarianscienceproblems/message/6080>

#### ЛИТЕРАТУРА

- Burns, R.J. (2002). Education and social change: a proactive or reactive role? *Intern. Rev. Educ.*, 48, 21-43.
- Trow, M. (1973). *Problems in the transition from elite to mass higher education*. Berkeley: Carnegie Commission on Higher Education.
- Бояджиева, П. (1998). *Университет и общество*. София: ЛИК.
- Георгиева, П. (2001). *Висшето образование в процеса на обществената промяна в България*. София: Национален институт по образование
- Димитров, Д. & Тошев, Б.В. (2001). Преди да е станало късно. 1. Реформата във висшето образование. *Стратегии на образователната и научната политика*, 9(2), 1-8.
- Тошев, Б.В. (2002). Преди да е станало късно. 4. Макдоналдизация на висшето образование. *Стратегии на образователната и научната политика*, 10(3), 1-8.

Чичовска, В. (1995). *Политиката срещу просветната традиция*. София:  
Унив. изд. „Св. Климент Охридски”.

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